MAY 1956

# Approach

NAVAL AVIATION SAFETY REVIEW

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*In this Issue*

TIME ZERO!
LET'S FLY THE NEW DEMON
THUNDERSTORM FLYING

Approach

THE NAVAL AVIATION SAFETY REVIEW

Vol. I

No. 11

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# Whatever Happened to the Waveoff?

Way back during the meat rationing days of World War II, a classic Dagwood cartoon depicted our hero looking up from the construction of one of his famous multi-decker sandwiches to wonder somewhat wistfully: "What ever happened to boiled ham?"

Similarily, we pause and look up from our chore of screening AARs to inquire: "What ever happened to the waveoff?" We seem to recall a time when the use of the waveoff, or go around, was a fairly popular tactic, shrewdly employed to prevent *real* embarrassment. Moreover, the waveoff was something to be encouraged, nay, demanded by skippers and flight leaders and the like as the only positive preventer of landing troubles.

No super-sensitive pilot ability was required to evaluate a situation for its undershoot/overshoot/groundloop potential; there was no implication of "grandma" concern to have everything just right—the waveoff was merely the result of a judicious appraisal of each approach.

And therein, we submit, is displayed the mark of the true professional. When a pilot no longer heeds the demands of vanity or misplaced pride; when he attempts not to salvage a plumbered-up approach with a desperate bit of squirming and jockeying, but rather shrugs it off as a well-deserved object lesson in complacency and tools around the circuit again—then he is a real pro.

How many salvage jobs have you done on fouled-up approaches lately? Wouldn't a waveoff have been smarter? Anybody, but anybody can butcher up an approach occasionally—the sharp pilot makes another pass.

Mark it well, there just isn't room enough in today's aviation picture for the doodling of the "artiste" pilot, for verily, "pride goeth before. . . . "

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**This periodical contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders or directives unless so stated. Material extracted from Aircraft Accident Reports, OpNav Form 3750-1 and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Names used in accident stories are ficticious unless stated otherwise. Photo Credit: Official Navy or as credited. Original articles may be reprinted with permission. Contributions are welcome as are comments and citicisms. Address correspondence to Director, U. S. Naval Aviation Safety Center, NAS Norfolk 11, Va.**

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# Letters to the Editor

Dear Sir:

In the March issue there is an article about VA-104 as a Safety Award Winner which says the squadron flew from the USS Coral Sea (CVA-43). Accompanying the story is a picture of a group of sailors taken aboard the USS Leyte (CVA-32). A boo-boo?

ANNABELLE F. FISCHER
Staff CINCNELM

*Righto, Annabelle—upon returning from the Med and finding themselves CNO winners, VA-104 found the pix locker bare. So they took their pic for* Approach *while aboard the Leyte later for a short cruise.—Ed.*

Sir:

Since we have subscribed to your safety magazine we find there are frequent articles covering torque problems.

For your consideration we are enclosing a copy of our Torque Manual. These manuals are free upon request. We would send any naval personnel a copy without any obligation.

LEE A. STURTEVANT
P. A. Sturtevant Co.,
Addison, Illinois

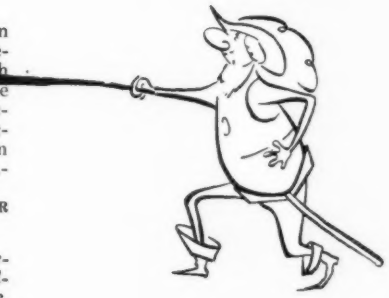
*Thanks for your offer, Mr. Sturtevant. Anybody interested?—Ed.*

I have been conducting dummy ejection drills for jet pilots on this station and have noticed that the act of pulling the apple on the bailout bottle is time consuming and quite often forgotten. . .

Since any extra action or confusion at the time of an actual bailout would be detrimental to the success of the bailout I am wondering if this one step could be done automatically. . .

LT F. Keyes, Jr.
Safety Officer
NAS Minneapolis

*Thanks for your detailed suggestion. Equipment people advise that automatic bailout bottles are being introduced in newer models of fleet aircraft.*



Sir:

Can we have permission to reproduce the Beechcraft story in the April issue of *Approach*?

Paul E. Allen
Beech Aircraft Corporation

*Glad to oblige. It should be noted, however, that* Beech *time was listed as 18.8 of all aircraft flight time reported for fiscal 1954. The correct figure is 14 percent.* — Ed.

Sir:

The article "The Soft Touch" in the November 1955 issue of **Approach** includes several statements on parachute landing techniques which this activity believes may tend to cause some unnecessary injuries to pilots and crewmen who attempt to use them in emergency parachute jumps. On the basis of experience gained in supervising more than 10,000 jumps, more than half by one-time jumpers, the information below is submitted and recommended for use in training pilots and aircrewmen. . .

CO Naval Air Technical
Training Unit
NAS, Lakehurst, N. J.

Thanks for the well taken points. Though too detailed to print here, our forthcoming revision will contain NATTU'S recommendations whose experience establishes indisputable authority. In the meantime, briefly, prospective parachute users should keep in mind: *Don't relax too completely prior to landing — Bend your knees slightly and tense your leg muscles to absorb the shock but do not reach for the ground with your toes.* Happy landings. — Ed.

Sir:

There are numerous training devices and training aids in addition to Dilbert Dunker which in their own field of application, are directly related to improving pilot technique and know-how. . . . It is my contention that aviation personnel would be interested in having a list of up-to-date training material on various aspects of aviation safety. . . . Some of these devices are aids and instructional recordings on voice procedure; approach control, GCA, & YE-ZB procedures; automatic rater card and projector transparencies on subjects on instrument flight.

I recommend an article in *Approach* on the subject. Technical information on the content could be supplied by the Special Devices Center.

—CDR John I. Leonard, USNR

*Good show—we've asked Special Devices Center for such info. Watch for it—Ed.*

Sir:

Using the new phonetic alphabet an aircraft commander called the Bomb Scoring Unit to say he was bombing LIMA target. The ground crew understood him to say KILO, and read this back to him. He agreed, and target information for KILO was set in. Needless to say it resulted in a gross error. When rechecking the score the error was detected. Had this been a combat drop, disastrous results might have occurred. All other communications were extremely clear. It appears that the phonetic difference between these two is insufficient.

L. M. SHOWALTER
O-in-C Jax Bomb Plot

*Exception noted and recorded. Any other instances?-Ed.*

Sir:

The following question appeared on page one of the March issue. "Should an NAS Operations Duty Officer allow a pilot to make an approved instrument approach to the air station when the weather is below the prescribed minimums for this type approach?"

Only in an emergency, should he permit the pilot to attempt an approach when the weather is below the prescribed minimums for the type of approach contemplated.

Not having a full set of current regulations with me, I base my answer on the only one available. Part 61 of the Civil Air Regulations under Instrument Approach Rules, Section 61.273, Approach and Landing Limitations, states: "No instrument approach procedure shall be executed or landing made at an airport when the latest U. S. Weather Bureau weather report for that airport indicates the ceiling or visibility to be less than that prescribed by the administrator for landing at such airport."

If I remember correctly, during 1952 or early 1953, an amplification of the above rule was issued by the Civil Aeronautics Authority. It went something like this — "Once the field went below minimums after you had started your approach, you were permitted to continue only if you were in your procedure turn or beyond." Possibly someone who is more up to date on this information will supply the latest regulation.

I am anxiously looking forward to the final solution to this problem and I am sure that you will receive many answers to this question.

LCDR E. L. Hutcheson
Det 10, Hutron Two
USS Iowa (BB-61)

***The deck is still clear for discussion. — Ed.***

Sir:

The enclosed clipping (*Aviation Age* of March 1956) should be of interest, especially to Navy pilots who fly SNB/JRB aircraft from fields from which jets also operate.

W. G. Winslow, CDR

The clipping reads: "CAA warns against crowding tail of multi-engine jet aircraft. Flight tests showed *Twin Beech* was violently uncontrollable at one mile behind a jet and uncontrollable at two miles. At three miles, it was in violent turbulence; at four miles control was barely possible.

"Same thing goes for all multi-engine aircraft with high wingloading and high lift coefficient. Extreme turbulence is result of high downwash angle, which causes nose-up pitching moment."

*Right you are, Commander. An article on the subject of wake-turbulence effects has been prepared and is scheduled for the June* Approach. *Watch for "Rock and Roll." Ed.*

Sir:

. . . I am concerned with the accidents resulting from high mach dives. Pilots roll into a dive at 43,000 feet, stand on the rudder pedals and watch the dials spin. Then, if they are quick, they can start a recovery before the airplane gets real stiff and they can't bend it out. This is a matter of seconds, and it's amazing how hard people will work to kill themselves for no thrill other than watching some lagging, inaccurate dials spin . . .

Norm Benedict
Office of Aviation Safety
Training, U.S.C.

*We're concerned too, Norm. Meanwhile, keep up the good work with those Navy boys you're training to be squadron Aviation Safety Officers. Machbusters might do well to re-read the thoughts of a veteran Grumman test pilot in "Olde Sonic Walle," January* Approach. *—Ed.*

Sir:

Have just finished the interesting article in the February edition of *Approach*. All that was said is true, and the recommendations made were fine, now all we have to do is make sure that . . . [it's] read . . . especially paragraph 4 of page 12 concerning rest.

Recently our squadron returned from Far Eastern deployment during which time we launched a good many low-levels. On the two that I flew (9 hours plus), word was received at about 1500 to launch at 0500 the following morning. As you know the briefing and study for this type hop could well be 2 or 3 days, yet we were expected to do it over night besides getting the sleep. Everything has to suffer, but mostly it's the pilot's sleep, (and safety). On one flight I became so groggy that had the flight been overland I believe I would have ditched. This was not from monoxide poisoning, but pure fatigue from lack of sleep.

I wonder what the statistics show regarding the amount of sleep the pilots involved in these accidents mentioned in *Approach* on low-levels had the previous night. Also the amount of time available to them from notification of flight and target to takeoff?

—VA—Safety Officer

*Amen, brother, there just isn't any substitute for proper rest and sleep if aviation safety is to be included on the flight schedule!*

*P.S. Extra copies of that issue were printed and are available on request for either pilot or staff discussion.—Ed.*

Letters may be forwarded either via official channels or direct on Anymouse forms. While all letters should be signed, names will be withheld on request. Address Approach Editor, U. S. Naval Aviation Safety Center, NAS, Norfolk 11, Virginia.

Clayton C. Jerome
Commanding General
Aircraft, Fleet Marine Force, Pacific

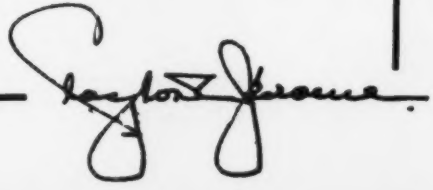
During the past several months the effectiveness of the Navy and Marine Corps aviation safety and accident prevention programs have been greatly increased by the assignment of additional graduate safety officers to the operational units. These officers can accomplish a great deal to further the aviation safety program. As aviation safety is a command function, the optimum value of these graduate safety officers can be obtained only if backed and fully supported by an aggressive and safety-minded commanding officer.

To keep pace with our "new look". of aviation safety, additional emphasis must be placed on the proper selection of the unit commanders. These commanders are the leaders, and must fully recognize the responsibilities for understanding and carrying out safe operational procedures. In addition, every effort should be made to provide the safety officer with all elements which will stimulate and assist him in carrying out his assigned mission.

The assignment of a large number of newly designated pilots will continue throughout the year, and these young officers must be trained in safe and efficient flying practices to enable us to reach a high state of combat readiness. All commanders are faced with a shortage of supervisory personnel, so that it becomes mandatory that the few older experienced aviators redouble their efforts if our safety programs are to succeed.

Aviation safety is a product of supervision and a by-product of efficiency. Supervision and efficiency at the operating unit level must be improved, and the ideas resulting in this improvement must be shared with all through the medium of the safety officer and safety publications.

We have made progress, but there still remains much to be accomplished. Flying can and must be made more safe. This will be accomplished by competent leadership, thorough and complete supervision and by inculcating in the minds of all hands, professional operations conducted by professionals



# TIME ZERO!

**. . . The pilot of the F9F-6 walked directly to his aircraft, and the final part of the pattern fell into place—the hands of the unseen clock moved closer together. Time was running out. BuNo 123456 was a TIME BOMB!**

THERE was nothing unusual about Sunday morning's activities at the reserve air station. It was cold—a 9-knot north wind put a cutting chill into the near zero temperature—but December in the Middle West was expected to be cold. A high overcast with good visibility promised favorable flying conditions and the station prepared for a busy day.

On the flight line of a reserve fighter squadron, crewmen worked at removing snow and ice from the squadron's *Cougars*. Two pilots had been scheduled for a 0900 launch but because of the ice removal takeoff time was delayed.

Shortly after 0900 the two pilots checked through the clearance desk and proceeded to the line shack where they signed out their aircraft. Leaving the line shack the pilot of Buno 123456 (a fictitious number) walked directly to his aircraft.

Ice and snow up to an inch covered the ramp with streaks of grey showing behind the parked airplanes where prop and jet blast had uncovered the concrete. Operations had inspected the area and declared braking action to be good. No sweat there.

As he walked up to his aircraft the pilot noted several crewmen finishing up the ice removal. Buckets and swabs lay off to one side and an NC-5 starting unit was in position. There was nothing to indicate that Buno 456 was different from any of her half-dozen sisters on the flight line and after a brief glance into the nosewheel well the pilot climbed into the cockpit.

But there was a difference this morning. Two weeks earlier there had been established a pattern of events which now moved to a climax. An unseen clock had been set in motion and time was running out. Buno 456 was a time bomb . . . *(Continued on page 6)*

BUAER USN
456
THE PILOT
THE MAN FROM AIRFRAMES...
AND OXYGEN
HYDRAULICS CONTRIBUTED
AN AIRMAN HAD A HAND IN IT...
SO DID A MECH...

# TIME ZERO!

*(Continued)*

The chain of events had begun innocently enough. On the first Saturday in December Buno 456 was written up for a hydraulic leak in the nosewheel well area. A dropcheck showed no trouble but a hydraulic leak was found in the canopy .selector valve which caused fluid to leak onto the pilot's oxygen system bottles.

No further work was attempted by hydraulic shop personnel as the bottles had to be removed for cleaning and work on the canopy selector valve would then be easier.

*In the F9F-6 the oxygen bottles are just behind the pilot and are reached through a hinged access door on the left side of the fuselage. Two control systems, the elevator control cable and the throttle linkage, obstruct any work in the area of the bottles and must be disconnected. The elevator cable is broken by quick-disconnect fittings at blow-in doors on top of the fuselage with the resulting slack allowing the cable to be pushed clear of the oxygen bottles up forward. The throttle linkage is disconnected in a prominent spot right at the access door.*

## the MAN from AIRFRAMES

The oxygen shop was notified of the need to clean the oxygen bottles. Another work order was now issued to clean and reinstall the bottles. Fifteen days to time zero.

Sunday was a busy day and no time could be spared for Buno 456. Monday and Tuesday were non-working days and not until Wednesday morning did two men from the oxygen shop begin to remove the oxygen bottles. **A man from the airframes shop was asked to disconnect the elevator control cable. One of the oxygen shop men disconnected the throttle linkage.** Eleven days to time zero.

## OXYGEN

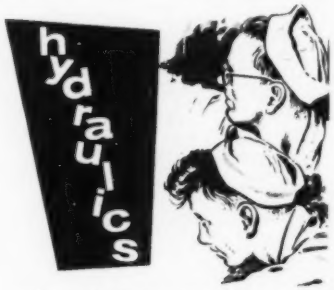
With this routine and uncomplicated act the breakdown of the maintenance system began. The hands of the unseen clock moved steadily on.

*How does a maintenance system break down? Where and when does the initial flaw appear in a system which had been in successful operation over a span of several years? Inadequacies of the work order system existed—the vital problem of dual responsibility of shops in completing a joint operation had not been completely resolved—yet, there is no known system or safety device which can remove responsibility from the individual connected with aircraft maintenance.*

After the elevator control cable and throttle linkage had been disconnected **the oxygen bottles were removed** and cleaned. Two hydraulics men **removed the leaking canopy selector valve** and repacked it.

Next day a different hydraulics man bench-tested the valve, reinstalled it, and checked the aircraft hydraulic system for satisfactory operation. He then signed off the maintenance department work order on the hydraulics discrepancy and returned it to the maintenance department planning office. He also notified both the planning office and the oxygen shop that Buno 456 was ready for the installation of the pilot's oxygen system bottles.

The planning office changed its status board to show that the aircraft was **down for oxygen equipment** rather than for hydraulics and two men from the oxygen shop began the work of replacing the bottles.




Though two men had been assigned to this job, only one of them worked on Buno 456 until the task was completed. After installing the bottles and hooking up the oxygen system the oxygen shop man called to a few mechanics working on a plane next to Buno 456. His words were to the effect that **Buno 456 was ready to have the throttle linkage connected.**

As this man walked away the unseen clock began ticking in deadly earnest. **He had neither observed nor received any indication that anyone heard him.**

Going to the airframes shop the oxygen man requested an AM to connect the elevator cable on Buno 456. After this he went to the maintenance department planning office where he signed off the oxygen shop work order. In the meantime two airframe men connected the elevator control cable. **They checked the control stick for proper operation and then went on to another job.**

Ten days to time zero.

During the time Buno 456 was down a leak had developed in the left brake assembly. On Friday the brake was repacked but it failed to hold under pressure. A new assembly was ordered but as there were none in the local supply the plane was grounded.

The new brake did not arrive so on the following Wednesday a brake from an ACOG aircraft was installed. **On Friday hydraulics personnel changed the canopy.** Two days to time zero.

By Saturday morning Buno 456 had been an armed lethal package for more than a week, the disconnected throttle poised like a firing pin as the hours moved past.

Now it apeared that her fatal ailment would be diagnosed —a mechanic began a preflight inspection in the hangar. However, in the course of his inspection he noted that the left fire warning light was inoperative. **He stopped his uncompleted inspection** and reported the discrepancy to his crew leader who reported it to the electric shop.

## the AIRMAN

The electrical squawk was soon corrected and then another mech was assigned to finish preflighting the aircraft. During his inspection he noted that the plane needed fuel and after having it towed to the flight line he went to the line shack where he reported this fact. While he was in the line shack it started snowing and word was passed that flying had been secured.

**The mech never did return to finish the inspection he had started.**

The number of hours remaining for Buno 456 could now be counted on your fingers. But there was one more good chance that she could be de-armed. Early Sunday morning an airman began another preflight inspection.

This time a small hydraulic leak was found on the nose strut and upon completion of his preflight the airman returned to the line shack and reported the leak. No mention was made of the condition of the throttle linkage.

One more small chance remained although only minutes were left now. As the airman departed for the line shack the oxygen cart was making its way up the flight line toward Buno 456. The airman had observed that oxygen pressure had been down to 700 psi and it was oxygen shop practice to replenish any system which was below 1000 psi. **If the system were filled the fuselage access door would have to be opened.** Just inside that door was the throttle linkage.

The airman and a mechanic returned to the plane to check the hydraulic leak and it was decided it did not warrant grounding the plane. Thereupon both men returned to the line shack and **the plane was made available for flight.**

Oxygen shop personnel had not kept a log and they were unable to recall whether Buno 456 had been serviced.

## . . . and the MECH

After putting his plane "Up," the airman left the line shack and returned to the flight line where he began working with a group of men removing ice and snow from the parked *Cougars*. The group moved down the line, swabbing the icy aircraft surfaces with frost spray and they were just finishing Buno 456 as the pilot walked up to his plane.

Buckets and swabs lay off to one side and an NC-5 starting unit was in position. There was nothing to indicate that Buno 456 was different from any of her half-dozen sisters on the flight line, and after a brief glance into the nosewheel well the pilot climbed into the cockpit.

But there was a difference. For Buno 456, time had run out. The engine starter whined against the inertia of the compressor and with the usual "bloomph" of igniting fuel the lightoff was completed. The last link in the chain of events fell into place—Buno 456 became an instrument of destruction. (*please turn page*)

After a normal start the engine did not level off at idle speed but roared into 100 percent power. In a runaway engine resulting from a disconnected throttle linkage, the high pressure shut-off valve would be free to move between the positions of *CUTOFF* and full *OPEN*.

Buno 456 slid forward on the icy ramp, jumped the chocks and headed for a P2V parked 200 feet in front. Picking up speed to 40 knots it struck the P2V's nosewheel and prop blade and began a skidding starboard turn which ended 240 degrees from the original starting direction. Part of the *Cougar*'s right wing was torn off upon impact with the P2V.

Engine still roaring at high power, Buno 456 again picked up speed and raced 200 yards into the side of another P2V at 60 knots. Emerging from

Before smashing into the hangar, Buno 456 left a mangled SNB and P2V to mark its fatal trajectory.

the other side of the *Neptune*, minus a port wing, windscreen and other small parts, the *Cougar* ripped off the tail of an SNB, ran between two fueling trucks then penetrated the side of a hangar at 85 knots.

The time was zero plus 30 seconds.

An intense fire broke out immediately and swept through the hangar, destroying the hangar and three planes parked inside. The pilot and two men in the hangar were killed.

After the fire the throttle linkage was recovered. It provided unmistakable evidence that it had remained disconnected in the oxygen compartment.

*(For more on F9F throttle linkages please turn to page 46).*

Now in quantity production, and with squadron delivery being made, the F3H-2 will soon be displaying its versatility to the fleet. An allweather fighter with impressive missile and weapons capabilities, the Demon is expected to earn thorough approval of its pilots.

# *let's fly the new* DEMON

By
**Bob Little**

***ABOUT THE AUTHOR—***
**R. C. (Bob) Little is Chief Test Pilot for McDonnell Aircraft Corporation. MAC considers him particularly well qualified to discuss the *Demon* since he first flew the XF3H in December 1951 and has been project pilot on the *Demon* series since that time.**

SOME of you fighter pilots will soon be flying the Navy's latest general purpose fighter, the F3H-2N *Demon*. This sweptwing job is the production version of the experimental XF3H-1 *Demon*. Intense flight research with the XF3H-1 and also the F3H-1N resulted in changes which are incorporated in the F3H-2N to mold it into a fine

airplane. Since I have done much of the experimental flying during the development of the *Demon*, I'd like to tell you about its characteristics.

The easiest way to do this is to take you on a brief hypothetical check ride. But while we're walking out to the airplane, let's mention the engine. The F3H-2N is powered by a J-71 engine. The J-71 delivers the thrust the airplane was designed for and has proven to be a good dependable engine that is easy to operate.

Well here she is. Look big? Don't let that worry you. She responds and handles like a much smaller and lighter fighter as you'll find out. Let's get in and fire her up, although for now we won't go into the starting process. Notice the stabilator, or "slab" tail? You'll like that. Like the F2H-3 and -4 *Banshees*, the *Demons* have irreversible power controls for the stabilator and ailerons plus the rudder. Artificial feel systems are also used but since you're acquainted with -3 and -4 *Banshees* we don't need to say much about feel systems here.

*More on the next page*

## DEMON (Continued)

You'll find the cockpit quite comfortable, with excellent visibility. Taxiing is a cinch. Braking action is good. Now just wheel her onto the runway and run up to military power for that last check. When you're lined up and cleared, release the brakes and light the afterburner. With brakes locked the tires will generally skid with afterburner power, so be sure to release brakes before going into afterburner.

Notice as you begin your takeoff roll that the stick moves aft slowly as airspeed increases just as it does in the -3 and -4 *Banshees*. The rudder becomes effective early in the take-off roll. Now ease her off gently at about 125 knots, and let her climb. You don't have to shut off the afterburner. We carry a big gas load in the *Demon* so climb her up to 35,000 feet and stay on the burner. We'll do some max level flight runs and some turns.

There now, level out and notice how she picks up speed and really scoots along. Notice you don't get buffet in the transonic speed range and you won't get any at supersonic speeds either. We're in the transonic range now and she won't go much faster level so ease her into a gentle dive with afterburner on. There, hold it at about 40 degrees. Now watch. Faster, faster, and right through the transonic speed range. See, no buffet whatever.

***Demon's size belies its maneuverability, and you'll find the cockpit quite comfortable, with excellent visibility.***

The *Demon* has no adverse effects in flying through the transonic and supersonic speed ranges. By that I mean no buffet, no retrim, no instability or other aerodynamic trouble. I feel this is remarkable, and as far as I know you won't find another current-day fighter plane any better than that. Better pull her out about 20,000 feet. Three or four G are okay.

Let's go back up to 35,000 feet again. We saw how smooth the *Demon* is in level or diving flight. Now I want to show you a couple of things you should know about the airplane with respect to maneuvering flight at altitude.

Okay now. Let's get squared away and try a few turns. We'll start with a turn to the left. Tighten it up a bit. Notice the buffeting as you increase G. That's the indication of the maneuvering boundary which is limited by buffeting at the higher combat altitudes.

The maneuvering boundary of any airplane is limited by buffet at high altitudes. You probably noticed the pitch-up tendency as we increased G in the turns to the moderate buffet level. This pitch-up condition is also common to airplanes with high combat wing-loadings and sweptwings. The important thing is that you become aware that the maneuvering boundary is limited by buffeting at high altitudes and that a pitch-up condition exists. This pitch-up actually occurs above the usable buffet level of the airplane, but if you do get into it, prompt forward stick application will get you out of it, no strain.

Now that we've done some turns; let's shut the burner off and drop down to 20,000 feet and try a few aileron rolls. You can get a good idea of the high rate of roll inherent in this airplane. There! How does it feel to roll 300 degrees in 1 second? No strain, was it? At high indicated speeds there is a lateral re-trim problem but if you fly your placards you will have no trouble. While I think of it let's relight the burner for a second. All set? Now feel the kick in the pants when the burner goes on. The burner sure makes a difference in this airplane. Let's start down. Afterburner OFF.

Better try some low speed flight before landing. You probably have guessed that a full stall in accelerated flight is difficult to obtain because of the heavy buffet preceding the stall. When you get used to buffet boundary limitations, you should hardly ever en-

counter a condition where you stall the airplane in accelerated flight. Remember in an accelerated stall you get a lot of buffet before the airplane will stall.

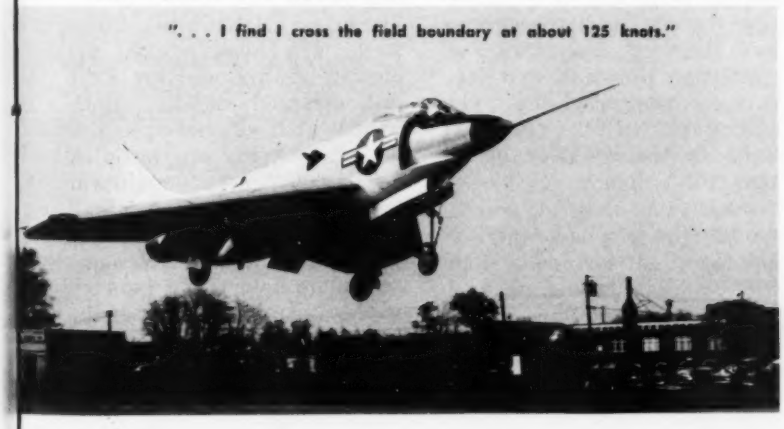
Actually, in steady flight in the landing configuration; gear, slats, and flaps extended, it is also practically impossible to stall this airplane. Buffet doesn't begin until you have reduced speed to about 100 knots and at speeds as low as 85 knots she still has not reached a full stall. However, the *Demon* begins to mush as you get below 120 knots. You still have good lateral and longitudinal control but you don't want to let her get too slow because below 120 knots you don't have accurate control of the sinking speed.

I don't have to tell you that loss of control of sinking speed can be disastrous. This is a thing common to high performance jet fighter planes and becomes very apparent in highly swept aircraft. Always remember it isn't wise to get the *Demon* below 120 knots in the pattern. This is about the same speed you use for the *Banshee* so it's no problem.

Let's point out again that there is no buffet warning as the minimum safe speed of 120 knots is approached nor is there any appreciable stall buffet at low speeds in unaccelerated flight. I find I generally cross the field boundary at about 125 knots. If you have the gear down, but flaps and slats retracted, stay above 140 knots and you shouldn't have any trouble. Just remember the slats are very important on this airplane. In fact, they contribute greatly to the fine low speed flight characteristics of the airplane. This goes for both landing and takeoff so don't forget to extend them.

With regard to spins, we have successfully demonstrated recoveries from upright spins up to five turns from various entry conditions. Actually, the chances of getting into a spin seem pretty remote considering the excellent slow flight control effectiveness and the adequate stall warning in accelerated flight.

The *Demon* has no adverse effects in flying through the transonic and supersonic speed ranges . . .



". . . I find I cross the field boundary at about 125 knots."

We'll go on down now and head for the field. I recommend a fairly flat, power-on landing approach and you should watch the altitude and airspeed and control the sinking speed.

Give yourself margin for a waveoff. Notice that even in rough air you have plenty of control available.

Notice the mid-span ailerons? These were installed to increase lateral control at low speeds and they do just that in addition to giving you a very high rate of roll at cruise speeds and above. You should remember that the ailerons and stabilator are very effective at all speeds. Now set her down. Like most tricycle gear airplanes, the *Demon* practically lands herself. Let her roll to the intersection then taxi back to the ramp.

Well it's been a pleasure having you on this little "ride" and I hope I hit on some points to acquaint you with the *Demon*. She's a good, potent airplane and in my opinion is very easy to fly. ●

# ANYMOUSE and

As the following Anymouse reports testify, the very items you depend on for safety and ease of flying can booby trap your flight if your airborne home has a case of

## COCKPIT CLUTTER

### Case I—TESTING, ONE, TWO—YIPE!

ANYMOUSE had a carbon monoxide test box stowed in his AD-4B and was at 7500 feet for a dive-bombing run. "I rolled in through the clouds," he said, "and pulled almost two negative G. I pushed the nose straight down and popped divebrakes. The plane then tucked under severely. I hit the trim tab, pulled back with both hands and pulled out in a gentle dive to about 1000 feet. Upon inspection the CO tester was found wedged between the seat and stick. The metal box was bent out of shape." (The CO tester is a valuable safety item and the box is equipped with D rings for secure stowage, though location seems to be at the pilot's discretion. For simplicity the bulb and test card can be carried in a flight suit pocket with the glass test units in the shoulder pencil pocket.)

### Case II—WATCH YOUR HAT AND...

Suddenly Anymouse discovered that power could not be reduced below 25 inches and the trim tab would not go into a nose-up position in his T-28. Mixture was placed in idle cut-off on final and a normal landing executed. Examination of the rear cockpit revealed that a passenger dropped at a previous field had hung his headset over the throttle arm and also left his seat belt loose which worked under the trim tab causing it to freeze.

### Case III—NO RELIEF...

On his first night cat shot Anymouse reported, "It was like being blasted into an inkwell. The nose pitched violently upward and my F2H lost airspeed rapidly. Both hands and all brawny 152 pounds heaving on the stick finally enabled me to maintain about 120 knots and climb more slowly."

The relief tube had come out of its holder and jammed in the control universals at the base of the stick. The clip which normally held the device in the caged position was bent out of shape.

# his hairy tales

**Anymouse reports are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. Forms for writing Anymouse Reports are available in ready rooms and line shacks. All reports are considered for appropriate action. Send reports to the Naval Aviation Safety Center, NAS, Norfolk 11, Va.**

## Case IV—KNEEPAD TROUBLES...

After a sharp pullout in a *Cougar* which was followed by several flaperon rolls, Anymouse discovered he could barely hold his port wing up. He reached down to turn up his cockpit lights and noticed his kneepad was gone. It was discovered wedged between the cockpit floor and the underside of the relief tube on the stick. Upon removing the kneepad lateral control was regained.

## CASE V—CHECK THE CHECKLIST

"I was making an approach in an SNB and everything was normal until just prior to touchdown. When I pulled back on the yoke for the landing flare I couldn't move it backwards enough to raise the nose. I was able to get the nose up only by adding power.

"I discovered the checklist (a plexiglas enclosed sheet of paper) had lodged between the yoke and the inverter thus restricting the rearward movement of the yoke."

## CASE VI—UNLUCKY TURN

*On a Friday the 13th* Anymouse was PPC of a P2V and was cleared into the traffic pattern. He rolled into a right turn, using about three-fourths aileron throw of the wheel. The wheel hit the copilot's hand and knocked the microphone out of his hand. At the time the copilot was looking out of the right window clearing the pilot's turn and he thought the microphone fell to the deck.

As the roll was established Anymouse tried to return the aileron to a more neutral position, but the wheel was locked in an extreme right wing-down position.

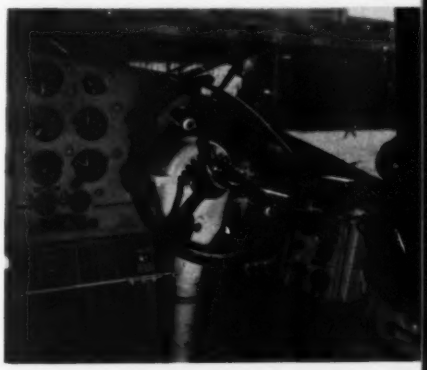
"I checked the autopilot," said Anymouse. "It was OFF. I increased and decreased aileron throw to the right two or three times but the wheel was still locked.

"By this time we were in a steep wing-down attitude and I used forward yoke and as much left rudder as I could muster to keep from rolling inverted. The copilot finally realized the dangerous attitude and looked back in the cockpit. He quickly got on the controls and helped me free them (the copilot, thank God, was 200 pounds and strong as a bull; the pilot, 140 pounds and weak as a kitten at this point). Recovery was made at 300 feet, below the pattern, and at 200 knots indicated."

When the wheel was freed the object jamming the yoke fell on the deck. You guessed it—the copilot's microphone had fallen over the wheel and became locked between the wheel and control column, as shown in the picture. Anymouse stated he has noted many occasions where pilots draped the microphone over the yoke when not using it and he is convinced that it is a very dangerous practice.

"I recommend that the jacks be relocated outboard of the pilot's seats or that lip-type microphones on the headsets with mike buttons on the wheel be furnished."

In checking for cockpit clutter pilots and maintenance personnel should:



. . . the microphone jammed between the wheel and control column . . .

- Examine the cockpit from outside and inside the aircraft for loose tools, flashlights or other unsecured gear.

- Check that empty seat if going solo in a multi-seat aircraft.

- Watch for loose fastenings and clips on articles stowed in the cockpit and on flight gear.

*More Anymouse tales next page*

# ANYMOUSE

(Continued)

## POINT OF NO RETURN

Two F9Fs filed night VFR from Quonset to Nashville with an intended refueling stop at Wright-Patterson, Columbus. Cruising along at 35,000 feet they approached the letdown point for Columbus, but decided they had sufficient fuel to make it to Nashville non-stop.

Anymouse and his wingman realized that they would soon be at a point of no return because no suitable fields existed en route from Columbus to Nashville. They turned south and things went according to plan until about 100 miles out of Nashville. At this time they found themselves in the largest and most violent thunderstorm they had ever encountered.

Anymouse remarked, "It seemed we were in this thing a good half-hour although I'm sure it was probably less than 10 minutes." He continued, "Our bird dog became erratic, VHF was useless, and both of us experienced St. Elmo's fire for the first time.

"To top it all off, our fuel quantity needles began to nosedive. One miserable thought we remembered about this time was that neither of us had ever landed at Nashville, a civilian airport, before. Add to this, shades of night and you can say we were two scared Anymouses.

"Lady luck was with us though, for we broke into a clear starlit sky just at the letdown point. We were lined up with the duty runway and a straight-in section approach and landing was made without incident.

"Louie, my wingman, ran out of gas when he hit the chocks."

## LOST ON LOCAL

Anymouse, on a local test hop in an F2H-4 under good VFR conditions, got lost because he did not keep track of his geographic position at all times. "As a matter of fact," said Anymouse, "I pretty well disregarded it. I flew around for about 40 minutes without paying any attention to navigation whatsoever except to test the bird dog and UHF homer before takeoff. The radio facilities chart is extremely handy in a situation of this kind. The UHF homer is loud and clear at 100 miles and gives excellent information which is effective to about 50 miles."

## FLICKER VERTIGO

"I was taxiing out as number 3 man in a flight of AD-4s on a late afternoon. We had to taxi directly into the sun to the takeoff spot and as the three planes moved slowly in column my attention was directed through the slowly moving prop to the plane ahead of me and into the bright sun.

"Suddenly my eyelids began to blink in rhythm with the prop blades, and although I shifted my gaze to the instrument panel to avoid the bright sunlight I sensed that my head and soon my whole body was flinching to the beat of the propeller.

"Although I fought to regain control of my movements all I could do successfully was brake my aircraft to a halt. From the positions of the other taxiing aircraft when I came to, I estimate that about 20 seconds elapsed during which I had no control over my aircraft.

"Needless to say I was a bit shaky after that, but I put on about 1000 turns which destroyed the flashing effect of the sun and I had no further trouble. I'm glad I wasn't rolling fast through a congested parking area or following too close behind the plane ahead of me when this incident happened."

(*Before you put that silk scarf on again, have a glance at "Light Fantastic," page 34 of this issue—Ed*)

**Headmouse has been reading and hearing about outfits which have developed good local Anymouse programs. A mighty worthwhile project! But remember, others may make the same mistakes—so send Friend Headmouse a copy.**

# HEADMOUSE

Dear Headmouse:

. . . there's something about which I'm a bit curious and wonder if you couldn't help . . . The problem concerns a sort of color blindness which has occurred at times of great excitement.

A few years ago I bailed out of a *Banjo*, and while coming down in the chute observed the crash of my aircraft. To this day I would have sworn that it hit a *pink* house. Actually . . . it exploded in an alfalfa field 50 yards or so from some white chicken houses.

Last month I had occasion to make a simulated attack on a CVA which was recovering aircraft. My run-in was made at minimum altitude and at full cob . . . I was really living it up. I passed under a *Cougar* at the "ninety" who appeared to be white. His red flaps were hanging down . . . with every detail correct except for the color which was . . . Navy blue.

What'sa matter with me Headmouse? Is this a common phenomenon amongst agitated aviators. Lord help me if I ever got shook enough to call a red running light, green.

—*Anymouse.*

*A possible "explanation" is that you were experiencing a negative after-image. Negative after-images occur when a person stares for a short number of seconds at an object, then shifts his eyes. The complimentary color appears in the after-image. Reds tend to become greens in the after-image, yellows tend to blues, and dark grays tend toward light grays. People learn to disregard after-images, but in abnormal conditions may readily pay attention to them.*

Sir:

In our S2Fs there is an alligator clip attached to each radio cord. This clip fastens on the shoulder harness release strap to keep the radio cords from fouling behind the pilot or crewman. Many of the personnel snap the clip to the shoulder harness itself . . .

On a routine inspection of all shoulder harness, two sets were found frayed (caused by the alligator clip) and one set broke on a static load tester at 600 psi. The harness is designed to stand a load of 2250 psi.

—Anymouse

*Like the man says it would be quite disconcerting to catch a wire on a CV landing and find your face imprinted in the instrument panel or radar scope—*

Sir:

Why was the Odd 'n Even Anymouse (page 23) in the March issue wrong as stated in the story? Reference CAR, Part 60.32.

Anothermouse

***You are an Eagle Mouse friend. Anymouse in the story was actually right. We didn't catch the fact that both the aircraft in question were on DVFR flights and printed the report as it came in. The pilot who was flying even thousands (10,000 feet) east-bound on Green 4 was in fact a candidate for a violation.***

***However, and this has happened, two aircraft can be in the clear, heading the same way on the same airway, with one flying odd thousands and the other on an even thousand. Both are at legal altitudes because one is on an IFR clearance and the other is on a VFR flight plan. On VFR you request the appropriate odd or even. On IFR you fly at altitudes authorized by ATC. Mix VFR and IFR traffic and the situation is just waiting to happen.***

Sir:

The position of the G-2 compass in the F9F-6P is in the worst possible position. Since a compass is read at the top, and it is impossible to see the top, a pilot must learn to fly reciprocal headings which leads to wrong techniques for normal instrument work. It is suggested that a change be made with some less frequently needed instrument.

*We agree—and we've heard this complaint before. This problem is one of many before Bu-Aer's Cockpit Standardization Committee for resolution.*

Sir:

I wish to thank you for your prompt attention to my "Paperwork Anymouse."

. . . our mechs have been recalibrating the tailcone on our F3Ds by putting a gage across the thermocouples and then decreasing or increasing the area to give the desired reading. This I understand is a fairly common practice . . . as few ships and Fasrons have the proper adapters with built-in thermocouples to do the job as is recommended by the manufacturer. Have you any comments?

*Anymouse*

*Use of a pyrometer to check tailcone area adjustments is the best method without use of a Jet-Cal Analyzer. This analyzer, stock no. R85-BH1N-BH-112J-24, is available through supply; the handbook of instructions, NavAer 17-15A-501, through Aeronautical Publications. Heater probes are designed and manufactured by the engine manufacturer and as yet are not in supply. For complete info refer to Westinghouse's Field Service Letter 34.01.00 of 23 Feb. 1955.*

**Have you a question concerning safety**

**Fire it in to Headmouse, NASC, NAS Norfolk, 11, Va. and he'll do his best to help**

"HERE WE GO

LOYAL readers of Naval Aviation Safety Center publications may recall that in May of 1955 the old Aviation Safety *Bulletin* predecessor of *Approach* offered some cautionary information regarding the approaching thunderstorm season. Without attempting to spell out specific procedure for each model airplane and phase of flight, the general reminder was made to be wary of thunderstorms. Too, a pretty effective rule of thumb was offered: "If you can't go over, or under, or around—go home."

Now, a year later, the thunderstorm aircraft accident statistics for the year have been reviewed for the lessons contained.

The results are now in; the picture is not pretty; some very fine pilots have been lost, and it appears that aviators continue to regard the matter of thunderstorm flying much too casually.

For those who may still consider the potential threat of thunderstorms as a relatively minor problem, to be solved *after* it is encountered, there is impressive evidence to discount such a notion.

*Item:* During calendar 1955 there were at least 27 aircraft accidents attributed wholly, or in part, to thunderstorms. Seem like a low figure? Take another look.

*Item:* In these 27 accidents, 20 airplanes received strike damage.

*Item:* In these 27 accidents, there were 16 fatal injuries. That places the thunderstorm situation very, very high in comparative lethalness. High enough to warrant particular

please turn the page

## "HERE WE GO AGAIN!"

(*Continued*)

attention in your flight planning. For example:

*Item:* Of the 27 accidents, 16 occurred on *VFR daylight flight* plans—only four were IFR daylight flight plans. Did you perchance make a mental note at this point?

*Item:* Regarding instrument qualifications, 21 of the pilots had standard cards; one had a green card—three pilots had *no* cards.

*Item:* The aircraft involved were predominantly single-pilot models; more specifically, the F9F-6,-7,-8, the AD, TV and four other models.

Moving on to other factors established by the statistics, see how you fit into this pattern: From the standpoint of individual pilot experience it appears that the greatest vulnerability to thunderstorm accidents occurs during the 500-1000 flight-hours phase of a pilot's career, although the 1500- to 2500-hour pilots are definitely not immune to trouble either. Again, the greatest vulnerability to thunderstorm accidents appears to occur in the 0- to 2-year experience period, with a recurrent increase appearing during the 11- to 13-year experience period.

VFR daylight flight plans are no guarantee against thunderstorms.

### More Unhappy Landings

A rundown on the nature of the accidents reveals that seven of the accidents happened during the landing phase, where landings were attempted during the time thunderstorms were close enough to the field to compromise those attempts. Here the general picture seems to be a loss of control resulting from gustiness, erratic winds, poor braking action on wet runways and from poor visibility.

Five of the accidents followed unsuccessful attempts to climb over the tops of thunderstorms. (See "And Then There Were None," November *Approach*, for an impressive account of this type of situation.) Of the 5 accidents, all were on VFR flight plans: 2 pilots were lost, 1 crash-landed with serious injuries to the pilot, the other 2 landed safely —at unintended destinations.

The ever-present problem of fuel exhaustion combined with disorientation was apparent in four instances, and 3 of the 4 pilots eventually abandoned their aircraft. Two were so badly disoriented from dodging thunderstorms that they would not believe vectors given by ground stations and ejected miles from where they thought themselves to be.

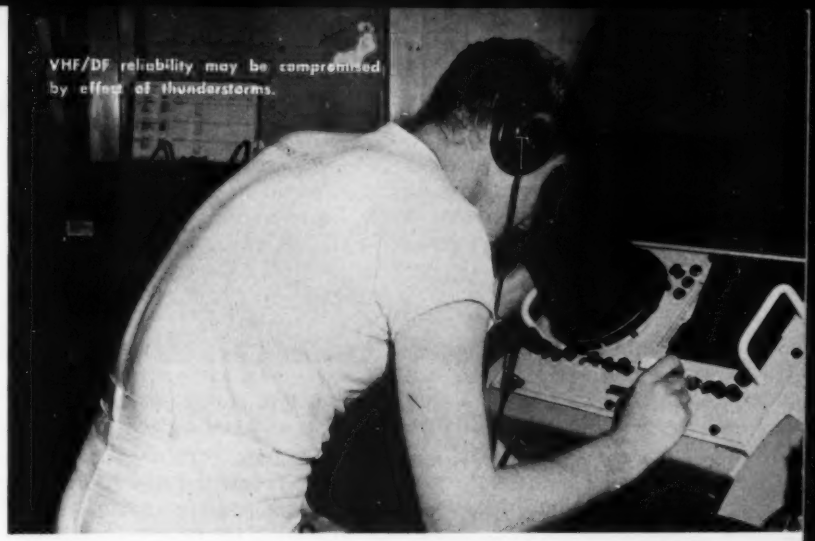
At least three of the fatal accidents are believed to have occurred when the pilots became disoriented upon going from VFR to IFR on entering thunderstorms.

There were others, involving things like control surface failure, mid-air collisions, and misreading of the altimeter during a jet penetration. From these at least one conclusion may be drawn; they need not have happened.

### Count Out the Bird Dog

Now let's poke into a thunderstorm, figuratively at least, and evaluate the factors induced by these cloud-mountains.

Going over the top is one way to avoid thunderstorms, if you know your airplane.


VHF/DF reliability may be compromised by effect of thunderstorms.

First, you can reasonably expect a reduction of navigation information from the loss of efficiency of equipment such as the ARN-6 direction finder and the ARC-5 low frequency range receiver. A similar limitation is often imposed on the ARC-2 MHF and the ARC-1 VHF when they are subject to interference. Result: an otherwise pretty good airplane is rendered unqualified for flying on a federal airway under instrument conditions.

Moving on into the thunderstorm we run into, literally, turbulence. Most pilots have experienced some form of the jolting, bouncing hair-raising gyrations which can make the altimeter needle spin like a top. Turbulence can also cause loss of control of the airplane from overstress of control surfaces or from increased stall speed due to high G-forces.

Now, for the optimistic ones who figure confidently to be able to go over the top of any thunderstorm which might appear, be advised that the accident figures show this tactic may often be an unhealthy one. Inadvertent penetration may easily follow, under conditions lacking the optimum speed and altitude factors you need.

**Count Those Pounds**

Frequently overlooked too, is the excessive fuel consumption experienced during thunderstorm evasion, while climbing, letting down, and during flight at uneconomical altitudes. Add things like this to your basic problem of thunderstorm transit and the situation can get real tender.

That's the general picture offered by the accident records. It is also quite evident that for every thunderstorm accident, there have likely been a surprising number of near-misses wherein the pilots wobbled out of trouble with little more than a premature greying of the temples as a result.

Any pilot can recall one or more such incidents which probably included one or more of these factors: On VFR during thunderstorm evasion; making transition from VFR to IFR upon entry into thunderstorms; inability of wingmen to maintain position when flying in formation in thunderstorms; plus things like frosting of the windshield during a letdown, or loss of communications and navigation aids.

These are the things of which dreams, the nightmare variety, are made, and usually, one exposure is sufficient to convince a shrewd pilot that there is a better way to cope with thunderstorms. The real answer is nothing more than a common sense appraisal of the situation, your capabilities, and the capabilities of your airplane. If you're still in doubt, last year's thumb rule still applies:

*If you can't go over, or go under or go around—go home!*

That's the picture as of calendar 1955. You can begin right now to paint the background of a beautiful safety scene in 1956—and you'll be around to look it over! ●

If in doubt about thunderstorms, the classic answer is the "180-degree turn."

# Swing Low, Sweet Ch

By
LTJG William P. Lawrence
6th class, USC

While he was attending the Naval Aviation Safety Officers course at USC this winter Bill Lawrence wrote this article as a class assignment. A naval aviator since 1952, Lt. (jg.) Lawrence previously flew all-weather *Banshees* with VF-193 in West-Pac. He is currently in test pilot training at Patuxent River.

HE'S going in!

All eyes on the flight deck strain to see an aircraft settling slowly toward the water after takeoff. The heavily-loaded craft just doesn't seem to have enough power to stay airborne. Everyone tensely awaits the seemingly inevitable ditching.

Suddenly . . . mysteriously . . . precariously close to the water, the plane becomes vitalized. It acts as though it has received a new burst of power. It levels off, commences a steady acceleration, and as speed is gained, chugs on up.

Although not everyday occurrences, incidents such as these are not uncommon in carrier operations. What enables these aircraft to save themselves in the nick of time —when their prop tips are nibbling at the whitecaps? Jato? Water-alcohol injection?

No—it is a simple phenomenon, referred to in aerodynamic terminology as "ground effect." Basically, it merely means that while flying close to the surface of the ground or water, an aircraft experiences improved performance.

It is readily apparent that a knowledge of the useful features of this ground effect would be very beneficial. Before discussing the various advantages and disadvantages of this effect, a simple review of basic aerodynamics might be helpful.

In developing lift, a wing must impart a downward deflection to the air passing over it, creating what we commonly know as "downwash." As can be seen in Figure 1, a detrimental by-product — induced drag—results as this lift is produced, since lift is perpendicular to the relative wind passing the airfoil.

In the slow speed regions where the angles of attack and downwash angles are high, induced drag reaches its greatest value. The undesirable features of high induced drag, as you might expect, are increased power required to maintain airspeed, greater fuel consumption, and higher angles of attack to produce a given lift.

Now, let's tie these bits of information together and see just what occurs in ground effect to improve aircraft performance. As an aircraft descends below an altitude of approximately 1½ times its wing span, the air flow over its wing becomes more efficient. This is shown in Figure 2 for one particular type of medium aspect-ratio wing.

The presence of the solid ground surface serves to decrease the vertical component of the downward air flow,

shown aft the wing in Figure 1. The net result is that the required lift is obtained with less downward deflection of the airstream. Most significantly, however, the induced drag, which is directly tied to the downwash angle, is greatly reduced.

So much for the long hair explanation. How can we relate all of this to our everyday flying experience? How often have you come in for a landing and floated much farther than you expected, because the airspeed just wouldn't pay out? This excess floating tendency can be attributed to the lower induced drag produced in ground effect to "kill off" the airspeed. As an additive factor, you were also experiencing a greater amount of lift for the particular angle of attack of your wing.

Have you ever chugged up the groove during *FCLP* and noted that you had to reduce your power lower than normal to keep the LSO from "hanging a fast" on you? Here again induced drag is the answer.

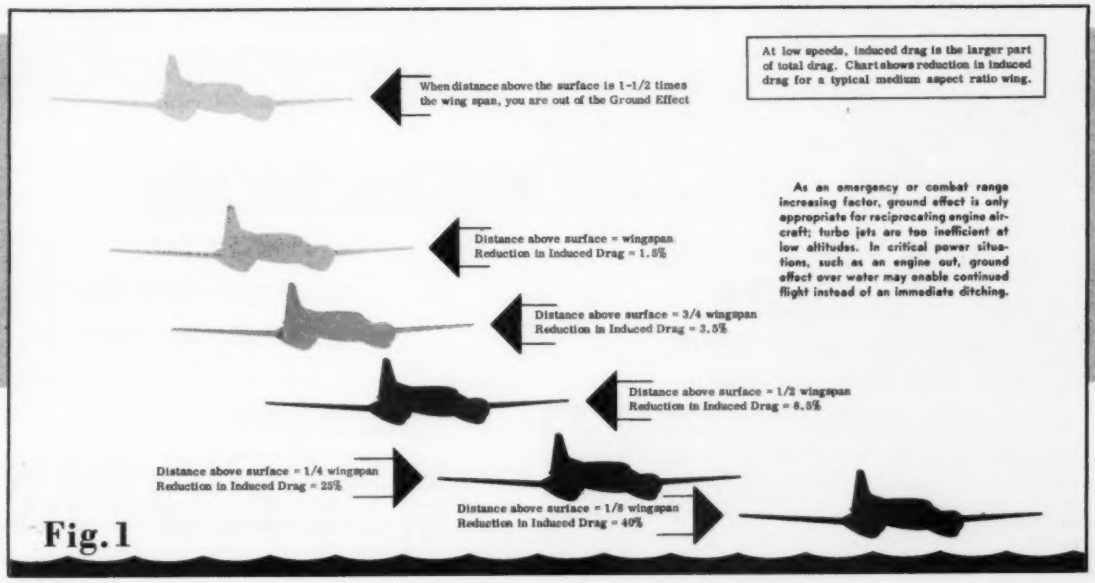
Associated with the lower power required to maintain a given airspeed in ground effect is a natural reduction in fuel consumption. This phenomenon was lucidly illustrated by an Air Force C-47 which practically doubled its range by flying just above the surface of the water.

Before you race out to your machine, eager to put your new knowledge into practice, let's discuss some of the less desirable features of this ground effect. We mentioned that the primary effect of the ground surface was to decrease the amount of the downwash angle. We also know that an aircraft is enabled to keep its nose up by the force of the downwash air upon the horizontal stabilizer. If the amount of the downwash angle is suddenly decreased, as in ground effect, the aircraft will naturally tend to act more nose-heavy.

Be alert for this tendency while flaring during a landing or when descending to very low altitudes. It will definitely be advisable to carry a little nose-up trim in these situations.

Although your aircraft produces more lift for a given angle of attack in ground effect, stall occurs at a lower angle of attack. This feature presents another area in which care should be exercised; be careful not to crank that crate up too high during landing, or you'll experience a stall sooner than you anticipate.

This discussion has not been presented to qualify you as a topnotch crop duster or to encourage you to engage in low level flathatting. Its aim has been to explain a basic aerodynamic principle in the hope that it may help you become a safer, more competent pilot. Ground effects can work for you or it can work against you — remember — you're the boss. ●


At low speeds, induced drag is the larger part of total drag. Chart shows reduction in induced drag for a typical medium aspect ratio wing.
When distance above the surface is 1-1/2 times the wing span, you are out of the Ground Effect
As an emergency or combat range increasing factor, ground effect is only appropriate for reciprocating engine aircraft; turbo jets are too inefficient at low altitudes. In critical power situations, such as an engine out, ground effect over water may enable continued flight instead of an immediate ditching.
Distance above surface = wingspan
Reduction in Induced Drag = 1.5%
Distance above surface = 3/4 wingspan
Reduction in Induced Drag = 3.5%
Distance above surface = 1/2 wingspan
Reduction in Induced Drag = 8.5%
Distance above surface = 1/4 wingspan
Reduction in Induced Drag = 25%
Distance above surface = 1/8 wingspan
Reduction in Induced Drag = 40%
**Fig. 1**

ADVERTISEMENT

ONLY

# THUNDER

HAVE THE EXTRAORDINRY
THAT MAKE THEWH

*from this*

An actual result from an ELEMENTrial
as possible in black and white fromretou

*You too, can make this* ple

① Pilot takes off and heads directly for biggest THUNDERSTORM in area. (A Beech is best plane for test but most any other will do . . . )

②

③ To insure full effect, pilot does NOT: reduce airspeed; get on instruments; utilize pitot heat or manifold heat; or turn up cockpit lights.

④

ACTUAL PHOTOGRAPH OF PILOT
**BEFORE**
TRYING OUR 10 MINUTE
*Elemental* TRIAL!!

CHECK THESE FEATURES:

- ✓ PROMPT RESULTS
- ✓ NATIONALLY RECOGNIZED
- ✓ ANTI-BODY-IC PUFFS

Actual on-the-spot sketch by on-the-spot artist of on-the-spot plane used in trial

USUALLY AVAILABLE ENROUTE
DURING THE SUMMER

UNIVERSAL THUNDER

OF THORL
OUR PRODUCE BY
(BUT THERE'S A DE DEVI

Remember! You read in A

# ...RSTORMS!

## ...DINRY *Elemental* INGREDIENTS ...HEWHAT THEY ARE !!

...EMENTrial is reproduced here as faithfully ...e fromretouched original color photographs

*to this*

*...this ...ple test and feel the difference*

...ggest ...e for

② Pilot heads for darkest area in anvil-topped buildup. He carefully maintains high airspeed and loosens shoulder harness for comfort.

④ Soon after entry, pilot begins to savor active ingredients. (For added thrill, conduct trial well away from route listed on flight plan.)

- ✓ TESTED BY AVIATORS
- ✓ TRUSTED BY NOBODY
- ✓ PROVED IN PSYCHIATRIC WARDS

ACTUAL PHOTOGRAPH OF PILOT

**AFTER**

OUR SENSATIONAL 10 MINUTE *Elemental* TRIAL!!

PRICE VARIES ACCORDING TO LOCAL BUILDUP

...ERSTORM INSTITUTE

...OF THE WORLD

...UR PRODUCE BY GOD!!

...HERE'S ALWAYS THE DEVIL TO PAY)

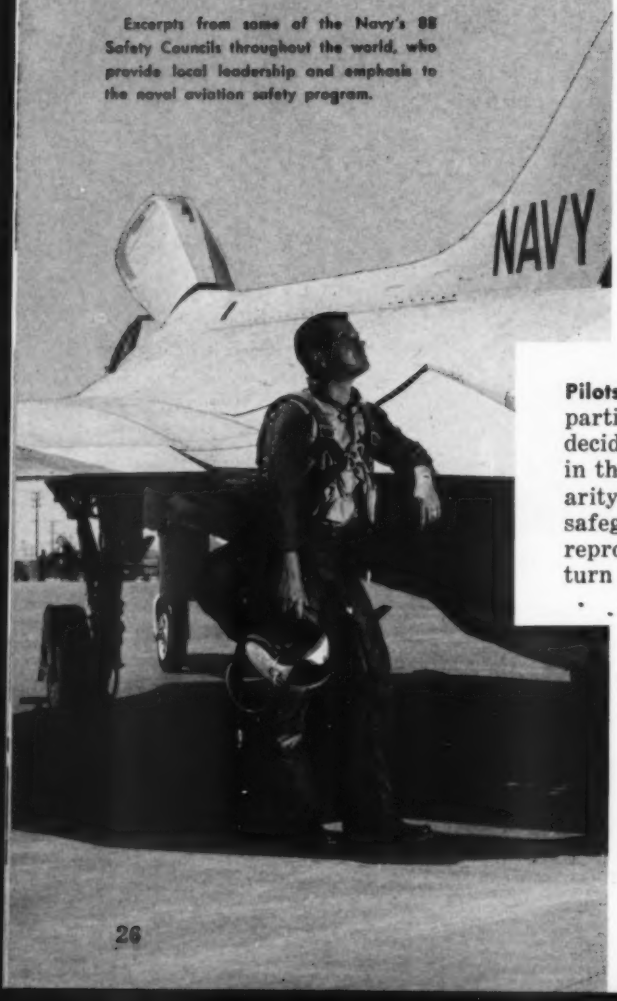
Actual photo of aircraft later...

Actual photo of aircraft later

...read in *Approach* May 1956!

# Safety Council Notes

Excerpts from some of the Navy's 88 Safety Councils throughout the world, who provide local leadership and emphasis to the naval aviation safety program.




**Helicopter Crash Crew Equipment Too Light**—It has been found that a requirement exists for the crash helicopter to carry a heavier fire axe and bolt cutters.—*ComFAirJax* (*NAS-Council Southern*)

**Fire Truck "Sits" in Garage** — An AD-4 crashed and burned after stalling during an emergency approach to a landing. The MB 1 fire fighting truck assigned to the crash crew was in the shop for repairs. The truck had been in the shop for approximately three weeks. Lack of a part caused the delay in repair. Crash equipment must be assigned the highest priority when placed out of commission for maintenance and repair. —*MAG 31*

**ADF 180° Ambiguity**—Complete dependence on ADF should not be a foregone conclusion as indicated by the example of an aircraft passing Ocean Station Delta where the Green ADF was inoperative and the Red ADF had a 180-degree reversal. An additional 60 miles of travel occurred prior to recognition of station behind, and not ahead, through signal fade. Pilots are therefore cautioned not to fly beyond their ETA relying completely on ADF—*AirTransRon 24*

**Pilots and Classified Operating Info**—Several accidents, particularly in the jet aircraft, have resulted from a decided unfamiliarity with confidential data available in the pilots handbook. It is considered that unfamiliarity exists because of the security requirements for safeguarding this classified data and the inability to reproduce this vital operating information which in turn seriously affects aviation safety.—*CNAResTra*

**Striped Fire Bottles**—A recommendation made to BuAer that fire bottles be painted with white stripes to make them more visible at night is undergoing test. If it is concluded that painting of the bottles is desirable, BuAer will take action to get the joint services painting specifications changed to allow the new painting methods.—*CNABaTra*

# Truth and Consequences

A DIGEST OF SIGNIFICANT AIRCRAFT ACCIDENT

Without power, the P5M dropped in from 250 feet . . .

## VP

## P5M

**THINK OR THWIM**—The pilot in the left seat of the P5M was on his third syllabus training flight and had 3400 total hours with 21.7 hours in the P5M. After three touch-and-go landings the instructor pilot in the right seat retarded the starboard throttle on the downwind leg for a simulated single-engine landing.

The before landing checkoff list had been completed except for the extension of flaps.

The aircraft passed over the approach boundary at an approximate altitude of 250 feet at 115 knots with flaps still retracted. At that point the student pilot suddenly chopped the port throttle. The aircraft nosed over and then at 100 feet assumed a nose-up attitude. It continued in a rapid rate of descent with the nose being further raised as the water was approached.

The P5M landed hard in a nose-high attitude and bounced about 25 feet into the air, struck the water again and made two or three small bounces before the props were reversed bringing the plane to a stop. Due to structural damage aft the plane was taking water. An emergency was declared and the plane beached as rapidly as possible.

In analyzing the accident the accident board found that the student had not previously experienced a no-flap no-power landing as such a maneuver was not demonstrated or practiced in the squadron. Doctrine for single-engine landings called for the use of flaps when the point of intended touchdown may be safely reached. The instructor pilot had not fully explained nor demonstrated the proper method for making a simulated single-engine landing to the student. The board felt the instructor did have time to take corrective action by reapplying power after the student cut it.

With the exception of one man, occupants of the plane were in proper flight stations with safety equipment being utilized. The one man who was not at his station received minor injuries.

The board recommended that pre-flight briefings be conducted by instructor pilots to assure that students are fully informed as to methods and procedures to be used in the maneuvers to be performed during flight.

## VS S2F

**COPILOT TROUBLE** — Weather conditions had deteriorated and the S2F was recalled to the carrier early. Two waveoffs were taken due to a pitching deck. The third approach was satisfactory and the plane arrived at the ramp in a good position for the cut.

The copilot was observing for a competitive exercise and had passenger time in the S2F but no pilot time. This was his first carrier landing. He had been briefed that the pilot would handle everything during the landing.

As the cut was given, power came off completely and the nose started down. The right wing dropped slightly after the cut. Shortly thereafter partial power was added by one of the pilots. Investigators were unable to determine which one. The copilot confused the pilot by shouting and apparently reaching for the controls at a critical time in the landing.

With partial power on, the S2F floated up the deck, drifting rapidly toward the starboard side. Just before hitting the aft 5-inch mount, the pilot firewalled the throttles in an attempted waveoff. The right wing struck the island at the O-6 level and after smashing into two parked planes, the S2F stopped forward of number 2 elevator. Injuries to the crew were minor but the S2F was a strike.

## VF F3D

**STALE PILOT**—Upon completion of a high altitude test operation the pilot of an F3D cut his power to idle (45% rpm) while at 30,000 feet and began descending.

The pilot was assigned to a test and evaluation unit and had a total of 4700 hours with 519 hours in the F3D. He was aware of the recommended flameout procedures for the model aircraft he was flying but had not practiced a flameout approach for six weeks.

The pilot broke on his initial approach at 1500 feet altitude with idle power and 245 knots. At the 180-degree position the aircraft had 1200 feet altitude and the pilot closed the divebrakes and dropped the landing gear. At the 60-degree spot the pilot felt he might not make the runway and began adding power. It settled into the ground 250 yards short of the runway then rolled and skidded up to the approach end of the runway. Fire broke out and the aircraft received strike damage. The pilot and crewman escaped without injury.

The accident board noted that the use of idle power from high altitude, down to the point where the pilot decided he was going to land short, constituted a simulated flameout approach. He erred in that the recommended procedures for a simulated flameout pattern were not followed (Flight Handbook and Naval Aviation Safety Jet Annual for 1955).

Turning on final the pilot saw he was low and added power.

# VF F2H

The chase pilot followed the lead aircraft into clouds . . .

**WHO CHECKS THE CHECKERS?**—Two *Banshee's* on a cross-country training flight were cleared westward from an east coast air station to cruise and maintain 31,000 feet. The lead pilot was an ensign being checked out in cross-country flying. A first-tour jaygee was check pilot and was flying a wing position, assisting the ensign with procedure as necessary.

Cloudtops along the route were variable from 30,000 to 31,000 feet and the aircraft were about 500 to 800 feet above the clouds. Shortly after passing a reporting point the check pilot noticed the lead aircraft making slight and erratic course changes. As he transmitted a query about a new heading the lead plane slanted into the clouds in a steep diving left turn.

Believing the ensign to be suffering from anoxia, the jaygee followed him into the clouds, transmitting, "pull your bailout bottle, level your wings, speed brakes," in quick succession. Visual contact was lost at about 25,000 feet and the jaygee tried to recover straight and level flight from a dive.

The accident board was unable to establish the exact maneuvers or attitude of the check pilot's aircraft but it was felt that he applied insufficient back pressure to pull the aircraft through from an unrealized inverted position to level attitude without excessive loss of altitude. When the altimeter indicated 10,000 feet he ejected, kicked free of the seat after a short delay, popped his chute and touched ground 3 to 4 seconds later.

Meanwhile, the ensign had recovered straight and level flight and climbed back to his assigned altitude. After reporting his inability to contact jaygee, he continued on to his original destination. Instead of anoxia, his erratic flight was actually caused by his preoccupation in the cockpit while trying to tune his ADF to the next station. (*Cockpit designers please note.—Ed.*)

According to the board the check pilot was in error in trying to follow the lead aircraft into the clouds where he was almost certain to lose visual contact and faced the additional hazard of vertigo.

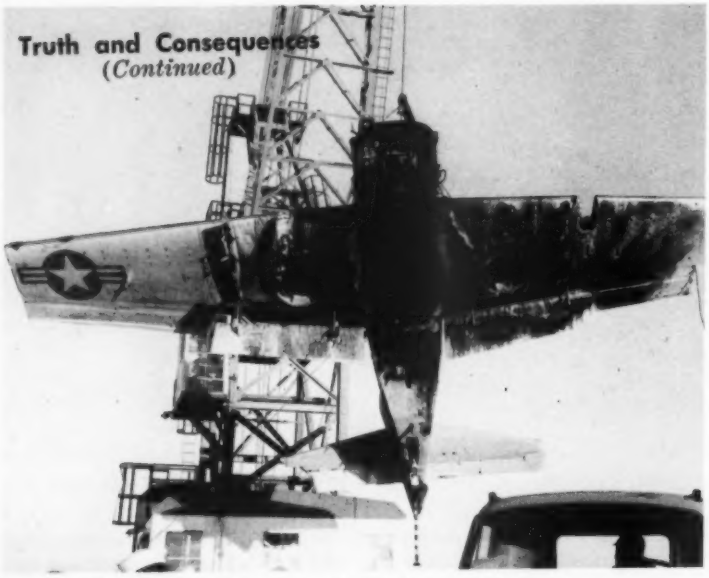
Pilot error was considered the primary cause of the accident in that the pilot was unable to recover from an unusual attitude. The pilot's scan pattern was poor because he glued his eyes on the attitude gyro and did not scan the other flight instruments.

**TOO MUCH—TOO LATE**—The carrier approach and cut of an F9F-8 were normal, but the pilot delayed his flareout and then over-flared. Contact with the flight deck was made in a tail-low attitude with an excessive rate of descent. The arresting wire could not slide up into the groove of the hook due to the landing attitude. Instead, it held on the lower lip of the hookpoint and caused hook failure. In addition, the port tire blew out because of the hard landing.

The aircraft was operating from an angled-deck carrier, which permitted the pilot to immediately add full power and effect a takeoff. Decelerated by the flat tire and engagement of the cross-deck pendant, the aircraft settled off the bow but maintained flying speed.

The late overflare caused the hook failure. Loss of the hookpoint committed the pilot to a barricade engagement on his next approach. Major damage was inflicted to the aircraft when it engaged the barrier.

## Truth and Consequences
*(Continued)*



Use of the windshield defroster or a waveoff would have spared the pilot an icy bath—and an Accident Report.

## VA AD

**COCKPIT FOG** — An AD returned from a night VFR fam hop, entered the break at 1500 feet and was at 1000 feet at the 180-degree position. The night was clear with 15 miles visibility but the AD's windshield began to fog up when the plane reached the 90-degree position. The pilot shifted to instruments and used his pressure altimeter for judging his altitude during the final approach.

No use was made of the windshield defroster nor was the radio altimeter a part of the pilot's scan on his final approach. As the pilot leveled the wings in the straightaway he glimpsed the water very close, out of the left side of the cockpit. He prepared to add power for a waveoff but the plane struck the water 900 feet short of the runway in a flat attitude at 100 knots.

After two impacts the plane stopped in an upright position and floated for about three minutes, allowing the pilot to evacuate the cockpit with no difficulty. His pararaft remained in the aircraft and his lifevest was a borrowed one which contained *used* $CO_2$ cartridges. The pilot spent a shivering five minutes in the water before being picked up. He had worn no exposure suit. The air temperature at the time was 35 degrees.

There was no evidence that the pilot was affected by carbon-monoxide poisoning. The accident board attributed the accident to pilot error in that an unnecessary instrument approach was attempted to a dangerously low altitude with VFR conditions prevailing.

## AD-5N

**VIOLATED SOP** — Returning from an extended cross-country flight at night, the pilot of an AD-5N found a low overcast over his home station. A GCA was requested and the operators were informed it would be a no-gyro approach. Shortly after the turn to final was completed the aircraft disappeared from the GCA scope and radio contact was lost.

Wreckage of the aircraft was discovered five miles from the field where it had struck a 30-degree slope while in a horizontal slightly nose-high attitude.

The pilot had been in actual control for a total of 10.2 hours. He had flown an additional three hours in the right-hand seat as another pilot flew the first leg of the flight.

Condition of the prop blades and impeller shaft indicated the engine was developing low power at the time of impact. Examination of the fuel pressure gage under ultraviolet light showed about 4 pounds pressure (normal pressure is 19 to 21 pounds).

The fuel selector valve was set on the left external tank, turned slightly toward the internal main tank. The possibility of the valve being turned due to impact forces

was ruled out due to its spring-loaded construction. It was determined that the two external tanks were empty or nearly empty at the time of the crash.

It was considered that only the gyro-horizon was inoperative and that the pilot erroneously requested a no-gyro approach.

The accident board concluded that the cause of the fatal accident was fuel starvation or near starvation and believed the pilot committed one of the following errors: (a) neglected his checklist and ran the left external tank dry, (b) switched to the left external tank when going over his checklist, (c) switched from the center external tank to the left external tank as the engine started to quit.

Pilot fatigue was considered by the board as a contributing cause of the accident. Squadron SOP prohibited pilots from flying in excess of 8 hours in any 24 hours. *This fact was also covered in the briefing for the flight.* As noted, however, the pilot had been in actual control for 10.2 hours.

The reviewing authority considered that with the presence of fatigue, strain and anxiety, the possibility of switching to, or remaining on an empty tank was very likely. It was also noted that it is inadvisable to advocate actual night GCA approaches with the gyro inoperative except in an emergency.

Of equal importance was the observation that failure of the pilots to comply with squadron SOP indicates a necessity for closer supervisory control.

With a 'qualified signalman on the flight deck there is little excuse for a pilot-caused accident during land/launch operations.

## HU HUP

**PHFFTT**—A HUP pilot had made one delivery of mail to a destroyer and landed aboard his carrier to pick up another load for delivery. Tie-down reels and chocks were used on landing but neither the rotors or engine were shut down.

After loading the pilot gave the flagman the thumbs-up signal that he was ready for takeoff. The flagman in turn gave the chock men a signal to remove the tie-downs. During this time the flagman had been displaying a red flag. Procedure required the chock men to carry their tie-downs to the area of the flagman, visibly displaying the reels to the pilot, then clear the area. The flagman then displays a green flag for the pilot's takeoff clearance.

In this case the flagman had the green flag furled in his hip pocket. In signaling for removal of the tie-downs he bent forward. The pilot thought he saw the green flag come from the flagman's pocket and several seconds later the HUP became airborne, hovering about one or two feet above the deck.

The port tie-down was still attached and tilted the aircraft to the left as it started horizontal flight. The tie-down fitting broke and a near normal flight attitude was attained, however the pilot made an immediate precautionary landing. Substantial damage was done to the fuselage as the HUP hit hard on the port wheel. No injuries or other damage resulted from the accident.

Recommendations for a different flag arrangement was not concurred in by the squadron commander. He noted present operating instructions are based upon years of experience gained in the helicopter field and are considered sound. With 500 hours in model the pilot was considered extremely familiar with proper operating procedures. But his carelessness and neglect in visually checking that the tie-down reels were off, seriously hazarded flight deck personnel.

This is the sixth accident since August 1954 involving confusion or lack of care in observing helicopter land/launch signals. Now that trained 'copter landing signalmen are available and are being utilized, pilots should take advantage of this safety factor.

## HU — HRS

**PRACTICE AND SERVO-OFF**—An HRS pilot who was designated a "limited" instructor had been assigned to give a new squadron pilot additional instruction in servo-off landings. The student had previously received a "down" on this maneuver.

Helicopter flight with servos-off is comparable to no-boost jet operation. Stick forces for both the cyclic and collective controls are heavy and require strong and positive operation. The condition is an emergency landing situation as extended flight is dependent upon the pilot's strength and physical condition.

The HRS proceeded to an outlying field where the instructor demonstrated two servos-off landings. Four normal landings were made by the student and on the fifth approach the instructor switched off the servos at 300 feet. The approach continued normal according to the instructor but at touch-down the aircraft shook violently as the skagbar and tail rotor hit the ground. The main rotor blades struck the tail cone shearing it off.

In its analysis of the accident, the board felt that the aircraft was inadvertently allowed to assume a nose-high attitude while both pilots concentrated their attention on controlling the stick forces. Supervisory error was considered a primary cause as both the pilot and instructor were relatively inexperienced and the instructor was assigned a task which he was not professionally qualified to handle.

Reviewing authorities stated that servo-off landings should be made at least once in the training syllabus to give the pilot indoctrination which will enable him to handle this type of emergency. However, repeated practice of servo-off landings was not considered necessary or desirable and only the most experienced instructor pilots should be assigned to instruct the maneuver.

## VAH — AJ

**'THREE TO GO'**—An AJ on a scheduled night familiarization flight was making practice full-stop landings. Following the third takeoff, the after-takeoff checklist was completed and the pilot turned downwind in a right-hand landing pattern. The landing checkoff list was started by the copilot, with the pilot acknowledging each item.

Abeam the upwind end of the runway, the pilot observed another aircraft crossing from left to right below him. At the same time, the tower called and advised the pilot to extend his downwind leg. The copilot requested a repeat from the tower, and was told to "disregard."

These two events, the other aircraft and the tower transmission, interrupted the sequence in performing the landing checklist. The copilot then continued the landing checklist; reported the pilot: "Full flaps and props to go" and called the tower on base, *reporting* gear down and locked.

The touchdown was smooth —so smooth, in fact, the copilot (a qualified PPC in aircraft) said to the pilot, "Very nice." But the aircraft continued to settle onto the runway, the "very nice" landing was completed, with the landing gear fully retracted

The medical officer's statement sums up this accident as follows: "There does not appear any evidence to indicate a psychological, pathological, physiological or sociological cause responsible for this accident, but rather an *interrupted habit pattern which had become too routine.*"

## NAS — SNB

**NAVIGATION ERROR** — Completing a night cross-country an SNB was cleared for an ADF approach to an air force base. NOTAMs reported the two radio aids used in the ADF procedure as unreliable.

Weather at the airbase was reported at 4300 feet, broken, with 10 miles visibility. Snow showers were present in the mountains to the north and east of the field but their presence was not reflected in sequence reports.

At 2116 the pilot passed a range station, one leg of which was utilized as an initial approach and he estimated he would begin his final approach leg in four minutes. Eight minutes later the aircraft was heard calling the range station but the transmission was interrupted. Negative results came from an ex-

Deciding to let down VFR the pilot abandoned an IFR approach

tended communications check and SAR facilities were alerted.

The plane crashed into a mountain slope at the 4300-foot level. Location of the crash was 20 miles from the range station and just to the right of the beam.

Analysis by the accident board indicated the following sequence of events may have led up to the fatal crash:

(a) After accepting a clearance for an ADF approach and reporting station passage the flight encountered partial VFR weather,

(b) While descending on the outbound range leg the pilots abandoned intentions to continue IFR flight and attempted to locate their destination visually; no attempt to follow the published ADF procedure was evident from the radio receiver settings and the location of the crash.

(c) Shortly before the crash the aircraft passed a fan marker six miles beyond their destination. Realizing their true position, the pilots attempted to reverse course, meanwhile contacting the radio facility,

(d) Reduced visibility in snow showers was encountered before the collision.

The board concluded that navigational piloting error was the underlying cause of the accident. In this respect the AAR endorsement noted that the importance of accurate timing in instrument flights cannot be overstressed. The cardinal rule of continuing with an IFR flight plan during IFR weather and marginal weather conditions must not be broken. The board added that contributing factors included a lack of appreciation of physical terrain hazards in areas surrounding the terminal and the local terrain influences modifying terminal weather depicted in sequence reports.

## VT UF-1

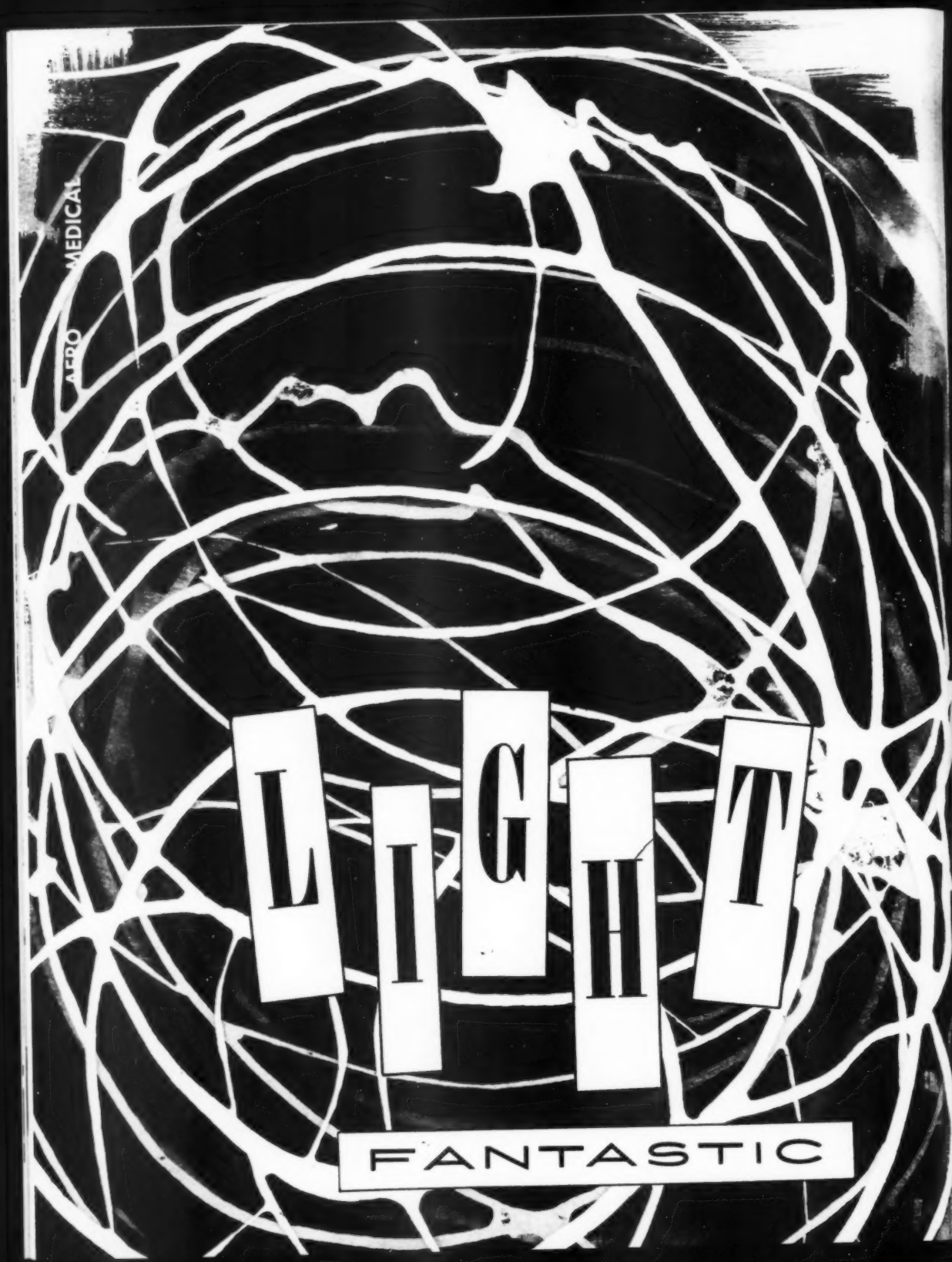
**FLAP CREEP**—A touch-and-go water landing was accomplished in a UF–1 and during the runout the pilot moved the flap selector from the 30-degree to the 15-degree position. Power was then added for takeoff.

At this time, and with about 60 knots airspeed, the aircraft suddenly began an uncontrolled turn to starboard. Throttles were closed and the plane continued to turn to the right, coming to a stop 100 degrees from the original track. Damage to the aircraft was limited to the nosewheel doors and the port wingtip float strut.

Subsequent investigation disclosed no failure or malfunction of the flap or hydraulic system. Both pilots stated however, that the flaps were non-symmetrical in position immediately following the accident. The starboard flap being extended about 30 degrees while the port flap was nearly closed.

The Erection and Maintenance Manual states that the flaps are apt to extend in an non-symmetric manner while taxiing or operating below an airspeed of 40 knots. The Pilot's Handbook makes a similar statement.

Recommendations were made by the accident board to adopt the procedure of cycling flaps either full up or full down after landing before selecting an intermediate position. Also, that on touch-and-go landings the flap position not be changed until airborne and at safe altitude. ●


AERO MEDICAL
LIGHT
FANTASTIC

LIGHT, in its proper place in our day-by-day scheme of things, is a pleasant, needed thing. Deprived of light, people naturally are uncertain and sometimes fearful. Light, if we think much about it at all, we regard as pretty nice to have around, especially at night, and we've gone to a lot of pains to provide man-made substitutes for sunlight.

Then there are times when light can be somewhat annoying, as when a particularly dazzling beam of sunshine is reflected in our eyes—or if some unromantic character should turn his headlights on the gals and boys parked up on the overlook. That sort of light problem we understand pretty well and can cope with. But there are other facets of light which affect us, as aviators, in a more serious, and less understood manner.

Did you know, for example, that if a light is flashed on and off at a gradually increased rate, the initial sensation of separate flashes of light is followed by a transition phase in which flicker occurs. This appears first as a slow flicker, then a rapid flicker, until, at what is called critical fusion frequency, the flicker disappears and a sensation of steady light occurs.

### Effect of Frequency

What you don't know perhaps, is that a flicker of a certain frequency, from 4 to 20 times per second, can produce unpleasant and dangerous reactions in normal subjects, including a reaction similar to an epileptic fit, or nausea, unconsciousness or vertigo.

Obviously, any of these effects would endanger the pilot's control of an aircraft. Just as obviously, some conditions producing flicker are inherent in aviation.

In a single-engine prop airplane, heading into the sun, the propeller may cut the sun to give a flashing effect. This is quite noticeable when the RPM is reduced for landing. In multi-engined airplanes there may be some effect on passengers at window seats.

Outside sources of light, other than sunlight, may produce a flickering effect.

A similarly confusing condition may become evident during night flight in the soup with navigation lights flashing. Here the danger lies in the reflection of the navigation lights against the shadowy backdrop of cloud mist and fog. Particularly distracting during letdowns and approaches, the obvious answer is switch lights to STEADY.

### Turn Rotary Beacons OFF

Returning to specific flicker vertigo, it has been reported that the investigation of a recent accident revealed that flicker vertigo from dual rotating beacons on the airplane reflecting in the overcast was a contributing factor to the accident. A recommendation was to "Turn off your rotary beacons before entering overcast."

A recent case of flicker vertigo was caused by sun reflection from a vibrating masonite hood installed in a plane for instrument flight practice. The pilot reported that there was no appreciable buildup time. As soon as the plane was headed in the direction where light produced flicker, it caused an immediate attack of vertigo. When the condition occurred the first time, the pilot felt that he was in a steep diving turn to the right.

As soon as he recognized that this was vertigo, he concentrated on the instruments and was able to read them although they seemed to be floating in the air. He found that he could stop and start the vertigo by holding the hood piece tight against the aircraft structure to stop the vibration. The vertigo persisted for about a minute after the flicker stopped.

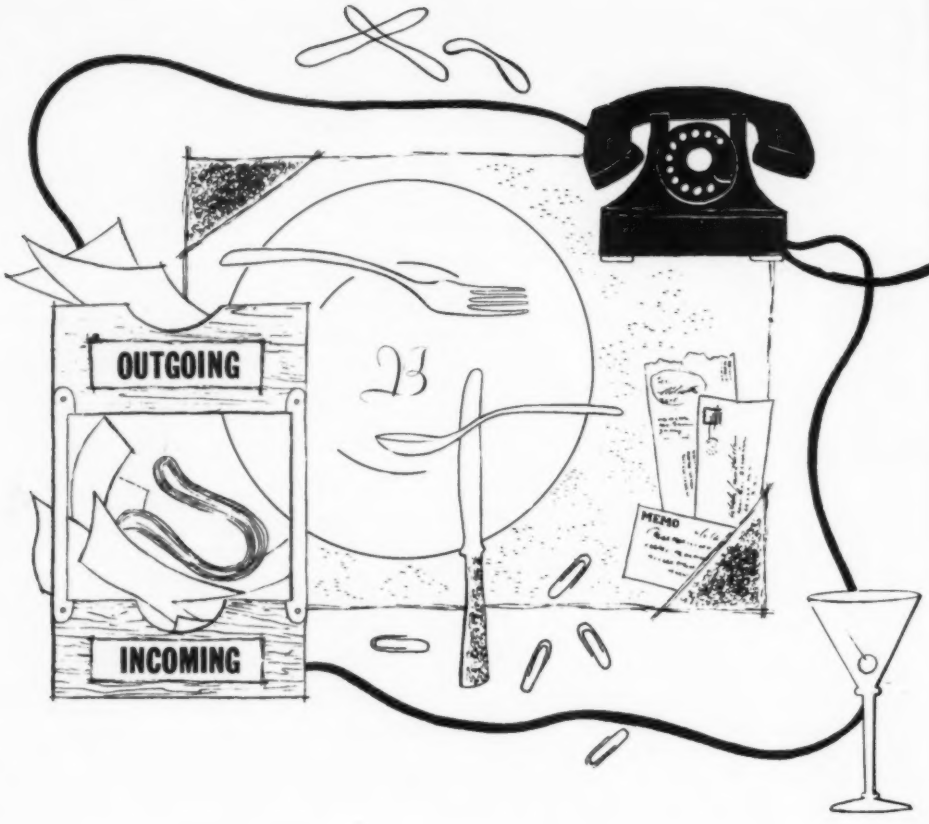
To the pilot, the most remarkable part of this experience was the "certainty" of his impression as to the plane's attitude. He had over 300 hours of instrument time including experience as an instrument instructor, but he reported that it took considerable willpower to believe his instruments.

### Watch Fatigue, Frustration

Manifestations of flicker vertigo appear to be even more pronounced when a person is fatigued or frustrated.

Aviators who can recognize the possible signs and causes of flicker vertigo may often be able to take appropriate action to modify the casual condition. A change in RPM will change the critical frequency with which the propeller is cutting the sunlight; practice flights can be conducted on courses not directly into the sun; window seat passengers can shield their eyes. In general the effects of flicker have been guarded against in ground lighting systems.

In explaining this phenomenon to pilots it is advisable to emphasize that light flicker is only one of several conditions which may result in vertigo. ●




# THE BATTLE OF THE BULGE

WHUU-UP! Need a hand there to help you out of your cockpit? Okay, altogether, heave! There, now, can you get down by yourself?

Hmmmmmn, that G-suit's really skintight isn't it. Looks like the bladders got inflated and the valves stuck shut. Oh-*Oh!* That's *you!* Obviously a poorly-fitted suit.

Whazzat? Yessir, there sure must be a lot of midgets flying these days—always leaving the lap belt and harness adjusted for minature aviators. It's not as though you were *really* fat, just beginning to get well filled out, sort of.

But did you ever get that feeling that you were being followed, only to realize that it was you? Have the characters in the readyroom begun to crack wise about taking off your parachute. What's your nickname around the squadron—Slim? Fatso? Chubby? Lard?

Well, these are the conditions that prevail—and if your uniform measurements have inflated excessively since the

days you were ensign-thin, why, it's time to avoid the avoirdupois, boys.

It's all very well for a cigaret to be so round, so firm and so fully packed, but for real flying pleasure, you should filter out the fat and let the real you through. For just how to pare down a pear shaped figure, take a tip from the men who know overweight problems best.

As the flight surgeon says, this overweight problem is a serious matter which has considerable influence on longevity and efficiency not to mention expense. We all realize, of course, that the excess fat factor increases with shore duty and desk flying, but not well appreciated is the somewhat higher penalty exacted of pilots by overweight conditions.

So, skipping over the very real and very painful economy factor raised by necessity to replace outgrown uniforms and clothing, let's move into the basic problem of overweight vs flight efficiency.

The budding Mister Five by Five should realize that with each additional pound of blubber he also acquires a greater susceptibility to hardening of the arteries, pneumonitis, diabetes, nephritis and arthritis. Consider also the effects on the aviation physical qualifications. The medics take a dim view of bulgy pilots, for a number of reasons.

### Certain Hazards Increased

For example, on explosive decompression, such as might be experienced during a high altitude ejection, ". . . the freed bubbles of gas can push little particles of fat into the blood stream where they can be carried to the heart and brain . . ." and cause serious trouble.

During hot weather down on the deck, or on long range flights, plump individuals are more subject to skin irritations aggravated by heat and perspiration and are quite prone to both prickly heat and wet chafing.

Then there are the bends and the book says that "tissues having the highest content of fat are most disposed toward bubble formation." In addition, G-forces, fatigue, anoxia and most of the other difficulties beset the over-weight man much more than the lean one.

### The Insurance Men Agree

Should you be skeptical of a mere flight surgeon's pitch, be advised that insurance company statistics conclusively prove that being overweight leads to an earlier death than normal. Being overweight predisposes one to heart disease, kidney disease and numerous other serious ailments which lead to an early demise.

On the other hand, there are positive awards to keeping your figure, for 98 percent of the people who are overweight and arrange to lose weight feel much better, sleep better and have more vigor and vitality.

### Why Do You Gain?

Why do you gain weight? The answer is easy. You gain because you eat more calories than you burn up. And you are likely to burn less calories at an inactive desk job (say an *Approach* typewriter.) You are also likely to eat more on shore duty, with some home cooking, visitors after dinner, and less necessity to omit the alcohol because of a flight in a few hours.

Maybe you have faced this overweight question and tried to reduce, but you're always hungry. Why? Well, without stretching you out on a psychiatrist's couch, overeating can be like the alcoholic's compulsive drinking; or it may be a habit.

You may sometimes be restless riding your desk—You may have a difficult letter to write. If you're "hungry," you have to have a candy bar —that postpones writing the letter for a little while. And a nervous stomach may contract like an empty one, which is downright confusing.

### How Can You Reduce?

Calisthenics won't help much for burning off excess pounds (only for flabby muscles). But your flight surgeon can tell you what foods are high in calories.

Though he may be able to give you an appetite-curbing pill, they won't do the job alone by a long shot. These pills have other effects and are not recommended for indiscriminate use, especially by pilots, but can be taken safely under your flight surgeon's direction.

One big help is that the stomach capacity lessens after about four days of eating less, and one begins to be satisfied with a smaller ration.

It has been said that an overloaded pilot is as unsafe as an overloaded plane. The most potent drug yet for reducing is sulfadenial. ●

# SNOOZE IN THE NIGHT

I'M (puff-puff) DR. Z. SUTURE - FAMOUS (puff) NAVY FLIGHT SURGEON. LET ME TELL YOU ABOUT A CASE IN MY FILES. MAYBE YOU WILL GET SOME GOOD OUT OF IT.
IT CONCERNED A NICE CHAP... NAME OF (puff) McCLOBBER... AND REALLY STARTED BACK IN:

1943

WHILE MOST NORMAL FOLKS WERE HITTING THE OL'PAD McCLOBBER AND HIS COHORTS WERE MILLING AROUND IN THE BLACK- LEARNING THE EERIE WAYS OF **Night Flying!**

SLEEP WAS THE LAST THING THAT ENTERED McCLOBBER'S MIND- USUALLY ABOUT 2 IN THE MORNING

IN TIME THE WAR ENDED AND BATMAN McCLOBBER (as he had come to be called) HAD TO DECIDE WHAT HE WANTED TO DO...

AND OF ALL THE THINGS HE WAS SUITED FOR, HE CHOSE FLYING... FOR THE NAVY... ESPECIALLY AT NIGHT...

BY 1952

BATMAN McCLOBBER HAD A LOT OF EXPERIENCE, BUT IN SPITE OF A CERTAIN AMOUNT OF CONFIDENCE THERE WAS ALWAYS PLENTY TO KEEP HIM BUSY...

...OR ALL-WEATHER OPERATIONS- LOTS TO KEEP HIM INTERESTED -
IT'S A BIRD!
IT'S A PLANE!
IT MUST BE BATMAN!!!
I KNOW IT'S (sob) HERE... SOMEWHERE!
NO
NAVY
AND NEVER ONCE DID HE GET SLEEPY!!

YESSIR! THERE WAS JUST TOO MUCH GOING ON IN NIGHT WORK FOR McCLOBBER TO LET DOWN HIS GUARD EVEN FOR A SECOND. AND YET, HE SHOULD HAVE GOTTEN AN OMINOUS CLUE FROM HIS EXPERIENCE ON THE GROUND:

PUFF

PUFF

BEING THE KIND OF GUY HE WAS-

FOR A WHILE BAT DROVE...

a Lottabrazzia X²!!

ROOM

(A SPORTSCAR...)

WHY DOESN'T THAT BLOWER CUT IN?

BUMP

BUMP

ROWR

AND WAS ALWAYS VERY ALERT. IN MANY WAYS IT WASN'T MUCH DIFFERENT FROM AN F4U-5N!

BUT IN TIME HE PICKED UP A MUSHREZE-BIE-8, A NICE, BIG, QUIET, SOFT-RIDING ROAD BEHEMOTH...

AND FOUND HIMSELF A VICTIM OF HIGHWAY HYPNOSIS*. WITH LITTLE TO WATCH EXCEPT THE THIN WHITE LINE STREAMING OUT OF THE DARKNESS, HE HAD A TENDENCY TO FALL ASLEEP!!

PRANG

BUT FOR SOME REASON McCLOBBER NEVER REALIZED THAT HIGHWAY HYPNOSIS COULD HAVE A COUNTERPART IN THE AIR, EVEN WHEN HE FOUND HIMSELF IN AN ALL-WEATHER SQUADRON WITH A BRAND NEW AIRPLANE DESIGNED ESPECIALLY FOR INSTRUMENT WORK...THE F3H-2N, WITH ALL KINDS OF PILOT AIDS...

1956 ... AND AUTOMATIC EQUIPMENT

WHY, FOR CROSS-COUNTRY WORK, ALL HE HAD TO DO WAS GET SQUARED AWAY...

AND THEN THERE WAS NOTHING LEFT TO DO EXCEPT MAYBE LOOK AT THAT BIG OL' MOON.

....just push a few buttons and RELAX

Man! all that QUIET! Look at that moon....

...sure is bright... hmm....sigh.....

...what a moon... ...ZZ...ZZZ....

A NIGHT PILOT'S DREAM-LITERALLY!

1 HOUR LATER...

AND BATMAN McCLOBBER NEVER WOKE UP FROM IT...

Ted Wilbur

*see Aero-Medical Safety Journal *4, page 18

**With the establishment of a Central Coordination Committee on Aviation Pathology, Dept. of Defense Directive 5154.11, military aviation medicine now has the machinery for expansion into a**

# Neglected Frontier

With increasing recognition being given to the importance of aviation pathology, enter Sherlock Holmes, M.D., with the title of "Forensic Pathologist," and of great importance to the successful investigation of aircraft accidents. "Forensic" in this case means: "medico-legal," and not a debate or an argument. This particular branch of pathology concerns itself with cases in which the cause of death is not known, or where unnatural, confusing or suspicious circumstances exist.

**Doctors *v.* Pathologists**

Flight surgeons study how to preserve life and health. But death, and the forensic pathologist's approach to discovering the cause from a dead body, are seldom emphasized in the regular medical curriculum. Pathology specialists are doctors who, by chemical, bacteriological or serological examinations performed during an autopsy, can determine the cause of death.

This is an entirely new role to most flight surgeons. In the promotion of aviation safety, it is a very important role which the flight surgeon must volunteer for, or the accident investigation board must insist that he assume. In fatal aircraft accidents, don't accept the obvious—give the body its chance to testify!

**Pathological Investigation**

A forensic pathologist investigating a death occurring as a result of an accident would be interested in many other factors than just the actual cause of death or tissue damage. He would be "suspicious" of any and all causes.

For example, if it appeared that the cause was of traumatic origin (a wound-type injury), all factors of a suspicious nature would be considered. What produced the injury? Point of entry, force applied, trajectory of the object—questions a modern Dr. Watson would have to answer for Sherlock Holmes, to provide evidence that would be the backbone of an investigation.

An excellent example of this type of investigation was a recent navy experimental jet aircraft accident. In this instance, an autopsy established that death had resulted from a severe blow on the pilot's head. It was finally determined from the factual evidence that the canopy had struck the pilot a fatal blow during his ejection. This design deficiency has subsequently been corrected. Without such a searching effort, this case would have been merely called: "injuries, multiple extreme."

Even where the cause of death seems evident, other injuries of equal significance may be demonstrable only by an autopsy. Dead men *can* tell tales that may prevent future deaths. Additional causative factors may be uncovered and aviation pathological findings fed back to prevent similar aircraft accidents. Unless an autopsy is performed, be careful of conclusions drawn from X-ray findings.

**Never Bury the Evidence**

Blood specimens from a crash victim may prove that carbon monoxide had been present in the cockpit. Corrective measures can then be applied to eliminate the danger at the point of origin.

An autopsy may be able to indicate the pilot was the victim of explosive decompression, spontaneous pneumothorax, convulsive state, anoxia or circulatory failure.

An attack aircraft on a low-level attack against a destroyer crashed into the ship. The pilot's body was recovered and it was determined that he had suffered a heart attack and was actually dead or incapacitated before the accident.

**Directives Re: Autopsies**

Autopsy instructions are contained in the Manual of the Medical Department, chapter 17. Based on the DOD directive, an OpNav Instruction is being prepared that will re-

quire the performance of an autopsy on a *routine* basis.

Examination by a forensic pathologist can obtain evidence which many times is unforeseen and unsuspected. There may be discovered alternative causes of death which will destroy the effectiveness of much good investigation work by the accident board.

The Joint Committee on Aviation Pathology will be concerned with all matters relating to the role of pathology as applied to aviation and flight safety, and will act as a focal point for the dissemination of information on the subject.

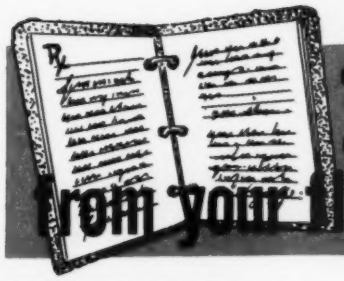
Commanding officers and flight surgeons should participate in this new program. Contributions are specifically desired in the following areas:

correlation between pathological evidence and causative factors of aircraft accidents;

pathological investigations which may yield information relating to the cause of hitherto unexplained aircraft accidents;

possible insidious changes induced by repeated and/or long duration exposure to environmental factors, forces and stresses present during flight.

Additional information relative to the activities of the Joint Committee on Aviation Pathology is available from the Armed Forces Institute of Pathology, Washington 25, D.C. Also available on request is the AFIP brochure entitled "The Autopsy." This publication tells what specimens to take and what to do with them. ●



# NOTES from your flight surgeon

## AUTOMATIC LAP BELT

The Bureau of Aeronautics has announced the installation of NAMC cartridge-actuated automatic lap belt separator in all production TV-2, F3H, FJ-3 and-4 aircraft. This type has a ¾-second delay between seat ejection and belt opening. Retrofit kits are being procured for incorporation in all fighter aircraft in service equipped with ejection seats, with the kits becoming available during this calendar year.

Two types of parachute openers are being procured, with a total of 2500 automatic units ordered. Delivery of the first of these units was programmed to begin during April. BuAer Aviation Clothing and Survival Equipment Bulletins will contain instructions for retrofitting the openers into both seat and back pack type chutes.

First priority for the parachute openers will go to units having aircraft equipped with the automatic lap belt separators.

## LEANING TOWER?

The Pensacola Naval School of Aviation Medicine reminds pilots that varying G-forces can create some bewildering illusions; like for instance seeing the George Washington monument bow to them in appreciation of a well-executed maneuver.

The same type of effect is noted when you are seated upright and whirled on a centrifuge at moderate speeds. You feel that you are changing position. Objects you know to be stationary also move around. The pull of gravity is no longer felt from beneath.

Now get off the centrifuge and instead, get into a plane. When you snap out of a series of fast rolls, fixed objects on the horizon seem to sail off into space. You just can't believe your eyes, but you can remember what you will expect to "see."

## HEARTS

Naval aviators are neither hard-hearted nor weak-hearted. They are stout-hearted men.

The School of Aviation Medicine has published a report which indicates that naval aviators are, if anything, less susceptible to hypertensive and coronary heart disease than are non-flying naval officers. Flying does put an extra load on the ticker. However, the fact that no permanent damage results is probably because the period of stress is short. ●

# The Right T

"I WAS in the passenger compartment of No.3 when on takeoff the plane raised 2 or 3 feet off the deck as on a normal takeoff and then rolled to the right and crashed on deck as if the pilot had no control over it." That is how the crew chief described the "feel" of an accident which involved an HRS-2 helicopter.

The accident board described its cause: "the elastic stop-nut, AN-365-428, attaching the left lateral servo to the short operating rod backed off allowing the servo rod to separate. This prohibited effective use of the left stick by the pilot." The board recommended that elastic stop-nuts used throughout the control system of the HRS-2 be replaced by steel stop-nuts and that elastic stop-nuts never be reused.

In another instance an SNB experienced loss of elevator control in flight due to backing off of elastic stop-nut on the elevator link assembly bolt. The reporting activity requested the Bureau of Aeronautics to reevaluate the use of elastic stop-nuts in lieu of castellated nuts.

Elastic stop-nuts were also reported loose on elevator hinge bolts of a number of F2H-1, -2 aircraft. In one case a bolt had worked completely free. Failure of the elastic stop-nut due to wear was suspected. The reporting activity requested the Bureau of Aeronautics to consider the feasibility of safety wiring the bolt.

BuAer, in each of these instances, advised compliance with instructions contained in Aircraft Structural Hardware Manual, AN-01-1A-8.

Several other recent inquiries concerning the use of elastic stop-nuts prompt these questions: "Are elastic stop-nuts unsatisfactory?" "Are they being improperly used?" The long

history of satisfactory experience with the use of self-locking nuts, both in the manufacture and maintenance of aircraft, tends to rule out the question of inadequacy in the reported instances.

A review of the Aircraft Structural Hardware Manual, and AN Specification AND-10068 brings up several tips on proper usage of self-locking nuts.

There are two general types of self-locking nuts currently in use: the all-metal type and non-metallic type with fiber or nylon inserts. These are so designated because they obtain their locking qualities through different means. There are many varieties of nuts in these general categories and their intended uses are numerous. Because of space limitations, this article is limited to general usage of elastic (fiber or nylon) stop-nuts.

Elastic stop-nuts are used on aircraft to provide tight connections which will not shake loose under severe vibration. They must meet critical specifications as to strength, corrosion resistance and temperature range.

Elastic stop-nuts should have a minimum torque upon engaging the locking insert. Nut sizes $\frac{3}{8}$-inch and smaller are checked by the fingertight method. Those that can be run down after the locking feature is engaged by this method are considered *unsatisfactory* for use. Nuts that have had the locking element reworked or reprocessed by other than a manufacturer are not to be used by contractors or field maintenance personnel.

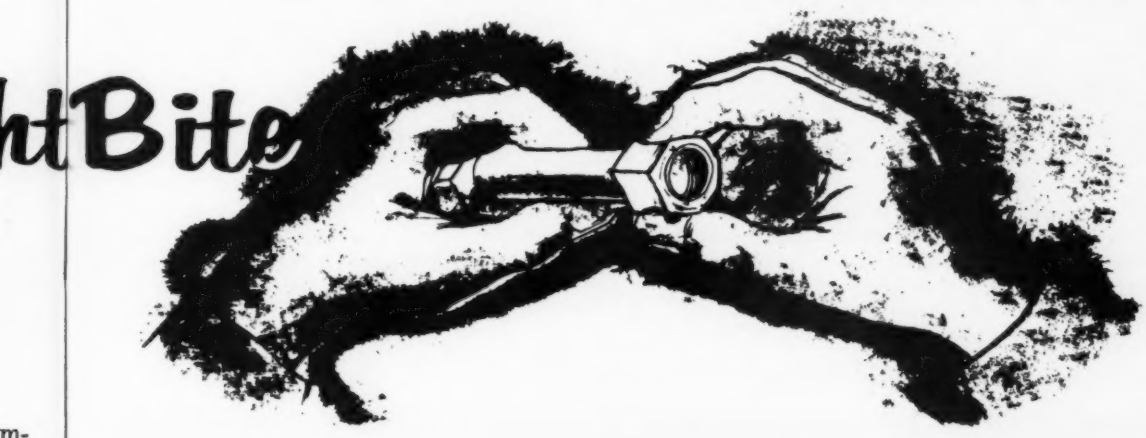
Nut sizes $\frac{7}{16}$-inch and larger require the use of a torque wrench to determine minimum torque values. For an idea of what minimum torque readings are required, here are a few examples: a $\frac{7}{16}$-20 nut, 7 inch-pounds; $\frac{9}{16}$-20, 18 inch-pounds; and for $\frac{5}{8}$-18, 18 inch-pounds. Refer to AN-01-1A-8 for minimum prevailing torque valves for both, fine thread and course thread series.

A minimum of one full thread should show beyond the top of the nut. Be careful that too many threads show also; the nut may be two-blocked upon the non-threaded portion of the bolt. It may be necessary to remove the nut to determine proper thread engagement.

Self-locking nuts are not used at joints in control systems of aircraft structure when movement of the joint may result in motion of the nut relative to the surface against which it is bearing. They may be used with anti-friction bearing and control pulleys *provided* the inner races of the bearing is clamped to the supporting structures by the nut and bolt. Nuts of number 10 and $\frac{1}{4}$-inch size shall be used with bolts, screws or studs that have been drilled for cotter pins. Corrosion-resisting steel self-locking nuts should be used only with corrosion-resisting bolts and screws.

When using elastic stop-nuts, remember not only to apply these rules of workmanship, but to apply the proper torque—the cause for an elastic stop-nut coming loose, and an accident report, will be a lot less likely.

*More Maintenance Notes next page*



# From the Ground Up

**Notes and Comments on Maintenance**

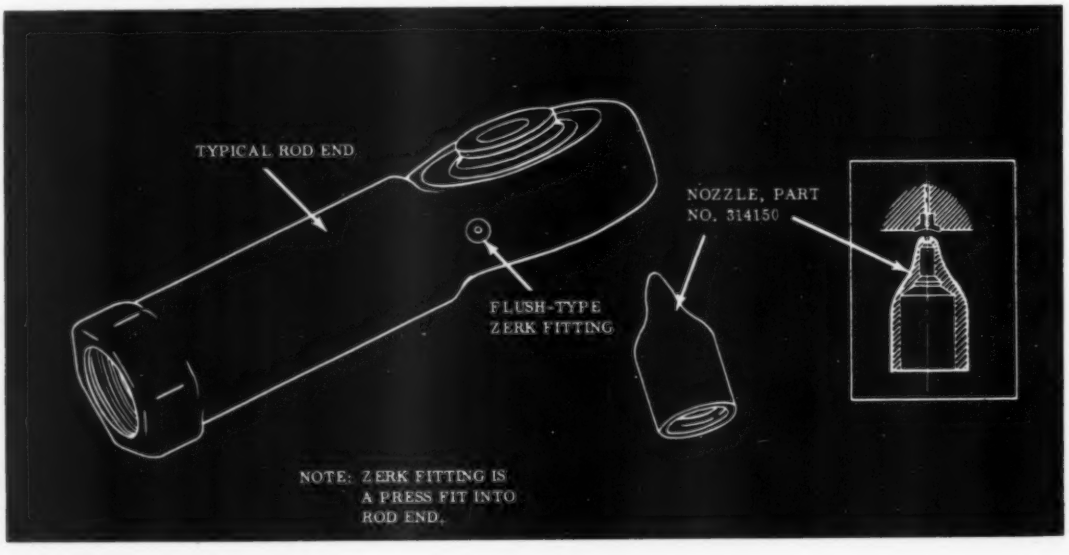
**FLUSH TYPE GREASE FITTINGS**—Safety Ampfurs of frozen rod end bearings in S2F and FJ model aircraft relate flush type grease fittings are being overlooked because of their small size. Close adherence to lubrication charts was recommended because of this factor. Flush type grease fittings are currently in use in newer model aircraft including F9Fs and F7U. The fittings are generally used on rod end assemblies of components with close operating tolerances.

Frozen bearings in some instances resulted because suitable equipment was not available to service these fittings. A grease gun with flexible hose and nozzle adapter (part number 314150, see illustration) attached is necessary to properly service this type of fitting. The nozzle must enter the fitting in a straight-in direction or at an angle of not over 15 degrees.

In the case of frozen bearings reported in S2F pushrod assemblies, the outboard bellcrank to the outboard flap sheared on flap retraction. Oiling of the fittings at each intermediate check was recommended where equipment is not available. However, lubrication with grease in accordance with lubrication charts is required when equipment is available.

The inaccessibility of flush type grease fittings in FJ-4 aircraft turnbuckle assemblies to leading edge actuators was reported to be the cause of frozen bearings. Pending a manufacturer's fix the reporting activity recommended the leading edge be dropped every 30-hour check.

Because of their small size flush type zerk fittings are sometimes overlooked.



PK-2s replace the life raft located topside of the S2F fuselage . . . It has been known to release inadvertantly and foul the tail. (Also see S2F incident in "old Pro" inside back cover).

**PK-2 FOR S2F CREW**—A recent fatal crash of an S2F was caused by the inadvertent release of the life raft located topside of the fuselage between stations 290 and 330. The raft came out and lodged on the tail.

In another instance an S2F had completed its seventh arrested landing. As the tailhook was coming up, the life raft compartment hatch was released from the fuselage, the raft inflated and forced itself out of the compartment. The raft was immediately cut free and the aircraft was taken below without further damage. The cause of the raft inflation has not been determined.

These accidents, plus an unsatisfactory history of life raft release mechanism in this aircraft, brought about directives that the life raft be replaced with PK-2 kits for all crew members in aircraft prior to S2F-1 BuNo 136403 and S2F-2 BuNo 133381 (BuAer msg 052020Z March provides detailed instructions on removal). Investigation of a suitable fix is currently underway.

S2F crewmembers are required to complete a checkout in ditching procedures, to insure familiarity with the techniques of exiting aircraft with life saving equipment in emergencies.

**TRIPLE EXPOSURE**—A couple of issues back a pair of T-28s were pictured in almost identical nose-up situations. Each was the result of pilot error but happened 10 days and a thousand miles apart. Not to be left out, maintenance personnel during a 7-day period in February had similar troubles with three F9Fs.

The first F9F was in for a 120-hour check. The check crew leader put the landing gear handle in the UP position and manually opened the wheelwell door in order to check the aileron boost poppets. Jacks were not in place and about 30 minutes later during a functional check of the ejection seat mechanism the battery switch was turned ON. Then the auxiliary hydraulic pump was turned on and the canopy actuating lever cycled.

About 15 seconds later the starboard landing gear collapsed. The landing gear handle was still in the UP position.

The second F9F was in for a 90-hour check. The plane was not on jacks, the tail was off and the nose gear oleo was deflated.

More on the next page

FROM THE

# GROUND UP

CONTINUED

To permit lowering of the landing gear door for greasing, the gear handle was in the UP position. Residual hydraulic pressure in the system was sufficient to unlock and move the nose gear enough that the nose gear did not relock when the handle was returned to the DOWN position.

The nose gear collapsed as a result of weight on the strut and the jerking motions of mechanics who were attempting to remove the engine.

In the third case a dropcheck had been completed and the F9F was being respotted in the hangar. A proper gear-down-lock check had not been followed prior to pushing the aircraft, and the port gear collapsed.

In the matter of distance the maintenance people outdid the pilots too. One was on the Atlantic Coast, one in the middle of the U.S. and one on the Pacific Coast.

## TIME TO SLAM IT SHUT

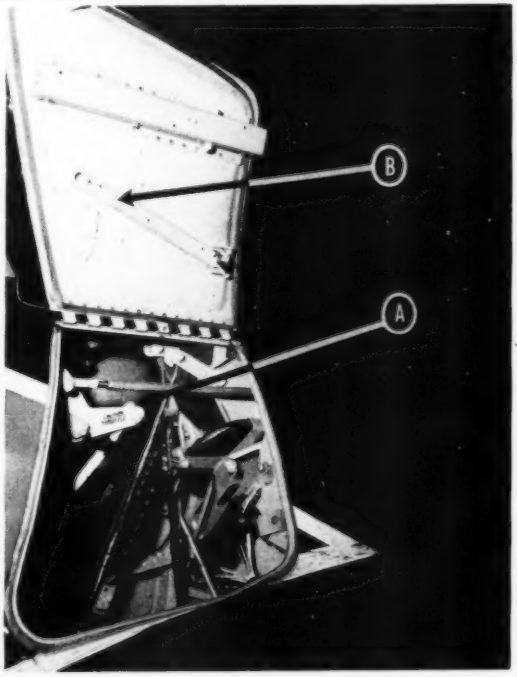
Since the occurrence of the fiasco related in "Time Zero" beginning on page 4, another F9F, BuNo 125637 (not fictitious), broke tie-downs, jumped chocks, glanced off a hangar, hit a parked truck, bashed another F9F-5 aircraft and continued to run at 100% rpm for about 15 minutes before shutdown. The aircraft was damaged beyond repair.

Cause of the runaway? — You've guessed it — THROTTLE LINKAGE NOT CONNECTED PRIOR TO RUNUP!

Several other serious accidents have resulted from this cause. In each case the throttle linkage was left disconnected after the oxygen bottle was replaced. The throttle is spring-loaded and goes to full power when disconnected. This is to allow the pilot full power in the event the linkage is shot away during combat.

For a better understanding of what to do in the case of run-away engine, the following is offered: Cut the fuel master switch OFF before the battery switch is cut — without electrical power the fuel valve remains open and the engine will continue to run. In short, keep your battery ON to cut your fuel OFF.

Better yet, prevent a runaway. Before the turnup, see that the throttle linkage is hooked up. Before you close that port fuselage inspection door, be sure the door support arm is stowed securely in its clip (see photo). If it's left loose, it can jam the throttle linkage.




The throttle linkage (A) was left disconnected after the oxygen bottle was replaced . . .

Be sure the door support arm (B) is stowed securely in its clip . . .

ANOTHER MURPHY*

ANOTHER VICTIM

# Murphy's Law

* If an aircraft part can be installed incorrectly, someone will install it that way.

THE PILOT of a disabled F7U attempted to eject from his aircraft. The ejection seat catapult failed to function. The pilot was killed.

What caused the ejection seat to fail the pilot?

Investigators, upon seeking the answer to this question discovered the ejection seat in the cockpit area. It had sustained very severe damage by fire and exploding ammunition. The top one-third of the catapult tube was found. The firing pin in the firing mechanism was in the firing position indicating the pilot had attempted to eject. The exploded cartridge case was still in the tube. Its primer cap was pierced by the firing pin and stuck to the inner face of the firing mechanism housing.

About two-thirds of the firing mechanism housing locking ring remained on the tube. The threads covered by the locking ring were clean and had not sustained fire damage as had the remainder of the tube.

Still probing, the investigators continued methodically. By putting the firing mechanism on the catapult tube they discovered that a clearance of ¼-inch (see photo) existed between the face of the catapult cartridge and inner face of the firing mechanism. Here was the answer; someone had installed the firing mechanism incorrectly! It was installed four threads (four full turns) short of being screwed down tight on the catapult tube! The firing pin could not reach the primer of the catapult cartridge. It was impossible for the pilot to eject.

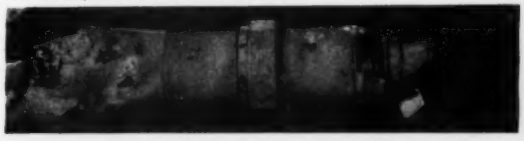
Threads on the NAMC catapult assembly number 16 per inch; each turn is the equivalent of $^{2}/_{32}$-inch. The gap between the firing pin in the firing position and the cartridge primer was $^{5}/_{32}$-inch. This being the case, *how* was the primer penetrated?

The firing mechanism housing, cartridge case and catapult tube were sent to a naval ammunition quality evaluation laboratory for analysis. The lab reported the cartridge had cooked off from the fire which followed the crash impact. The cartridge head had expanded into the triggered firing pin when it exploded.

Ordnancemen should always keep in mind when installing the firing head of the catapult that unless it is two-blocked against the cartridge, it is the same as an open breach in any gun.

*It just can't fire.* For more details on ejection seat maintenance see the March 1955 issue of the Aviation Safety *Bulletin* and Technical Order 99–52.

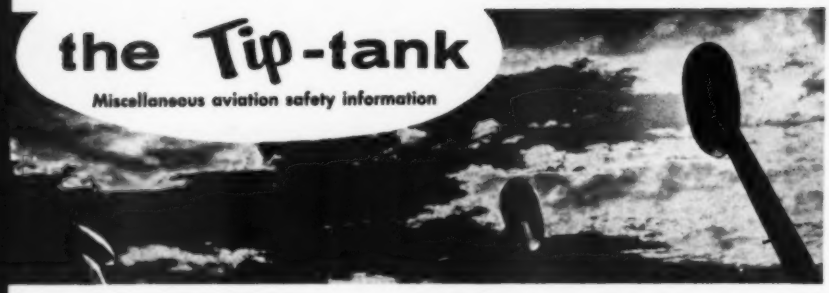
A redesign of the firing head is currently being developed by the Aviation Medical Equipment laboratory. In the meantime it looks like the NAMC catapult is going to be with us for a while. So remember, this is one aircraft part that can be installed incorrectly, and if it is, *you* are denying some pilot the use of a means to save his life.



. . . the firing mechanism had been installed incorrectly—it was screwed down ¼-inch short . . .

# the Tip-tank

Miscellaneous aviation safety information



**RE: THSMS**

"While cruising at 35,000 feet, an aircraft entered a thunderstorm where it encountered extremely severe turbulence. In rapid order, the aircraft stalled twice and started a spin. The pilot recovered on instruments for each maneuver, but could not maintain a wing-level attitude.

"The plane then flipped over on its back. The pilot rolled it back, but the plane stalled a third time and dropped off on the left wing. The pilot was finally able to recover in a wing-level, nose-low position and level off at 23,000 feet."

*Recommendation:* "The incident serves as a dramatic reminder to be particularly alert when flying through thunderstorm areas. Pilots should again be briefed on effects of gust loads encountered in thunderstorms, reminded to avoid thunderstorm areas whenever possible, and to make any necessary penetration in accordance with instructions contained in the Handbook." — *Combat Crew*

**CLOSER THAN YOU THINK—**

It was reported here ("Future Airways Problem?" March) that an R4D-8 received damage to the extent that excessive rudder was required to maintain its heading. The damage was the result of absorbing a shock wave generated by a jet aircraft passing on a near-collision course in one-mile-with-haze visibility.

A recent Aeronautical Research Laboratory report by the Wright Air Development Center casts additional light on the subject:

Theoretical and experimental investigations were made of the sonic boom to study possible military use of the shock wave pressure, possible damage to buildings, effects on people, pressure characteristics on the ground and relation of those characteristics to airplane flight conditions.

"Near an aircraft which is creating a shock wave the rate of decay of the shock-wave pressure jump is very high; at a distance of one wing span from the flight path axis, it is expected that the shock strength is only about 35 percent of the normal shock strength at 1.1 times the speed of sound."

**USE OF OMNIRANGE**

The effectiveness of the omnirange (VOR) depends upon proper use and adjustment of both the ground and airborne equipment. The accuracy of course alignment of the omnirange over 360 degrees azimuth is excellent when compared to that of the L/MF range, being generally within 2 degrees (plus or minus).

On certain stations some sectors may contain slightly larger errors, but no course published as usable in the *Airman's Guide* will be displaced more than 3½ degrees from its theoretical location.

Certain minor irregularities may be observed in using VOR facilities, such as apparent course roughness, infrequent brief flag alarm activity, course deflections and/or limited distance range. Pilots flying over unfamiliar routes are cautioned to be on the alert of these apparent vagaries.—*Airman's Guide.*

*Watch for a major article on Omni in an early issue of* APPROACH—*Ed.*

**REMINDER—**

Only two months remain in the 1956 CNO Aviation Safety Award competition — two months which can be mighty important to everyone having an eye on one of the handsome emblems of naval aviation's highest achievement in safety. So, keep up your efforts, and remember, the significant thing about this competition is that whether or not you receive a plaque, when you go all out for aviation safety *everybody wins!*

The Goal is 3.0 in '56!

# OLD PRO CLUB

## ROSTER

**David R. Cella, Lt. (jg.), USNR-R**
VS-21
Aircraft: S2F-2

When the forward end of a 5-inch HVAR rocket motor ricocheted off the target and struck his aircraft, shattering the rudder-yoke assembly, Cella experienced complete loss of rudder control. However, he climbed his aircraft to altitude, tested it in the landing configuration and descended to complete a skillful landing without further damage.

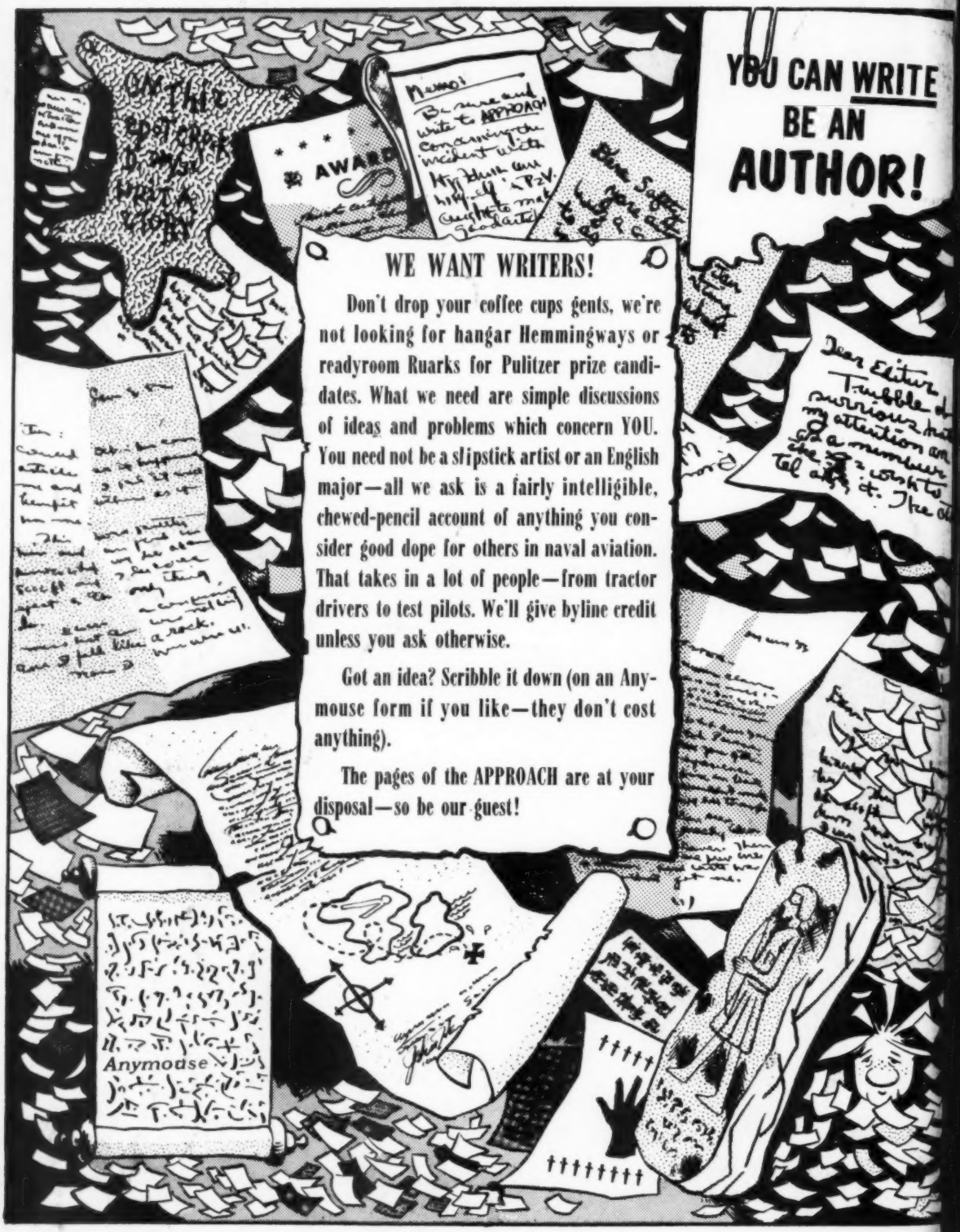
**Lewis M. Millsaps, Lt., USN**
VAH-7
Aircraft: AJ-2

While flying from Argentia to Patuxent River, at a position about 50 miles north of Boston, the entire port engine and propeller of the AJ-2 fell off, breaking cleanly at the firewall. The aircraft nearly went out of control with extreme buffetting. Millsaps was able to regain control by immediately starting the jet engine. He succeeded in flying to Boston, lowered the wheels and flaps by emergency procedures, and effected a safe landing at Logan International Airport without further damage.

**Alfred D. Steinman, Lt. (jg.), USNR-R (Pilot)**
**Leland S. Williams, Lt., USNR, (Copilot)**
VS-32
Aircraft: S2F-1

During a catapult launch, the liferaft compartment cover came off, and at approximately 800 feet altitude, the liferaft blew out of the compartment and caught on the horizontal stabilizer. The aircraft nosed over severely, requiring both pilots on the controls to hold the nose up. Steinman and Williams brought the plane around and made a successful emergency carrier landing.

Recognition of headwork flying is essential to a positive program of flight safety. Each month, Approach will acknowledge certain selected individuals whose exhibited flying ability merits membership in the "Old Pro Club." Commanding officers are invited to submit nominations for selection.


YOU CAN WRITE
BE AN
AUTHOR!
WE WANT WRITERS!
Don't drop your coffee cups gents, we're not looking for hangar Hemmingways or readyroom Ruarks for Pulitzer prize candidates. What we need are simple discussions of ideas and problems which concern YOU. You need not be a slipstick artist or an English major—all we ask is a fairly intelligible, chewed-pencil account of anything you consider good dope for others in naval aviation. That takes in a lot of people—from tractor drivers to test pilots. We'll give byline credit unless you ask otherwise.
Got an idea? Scribble it down (on an Anymouse form if you like—they don't cost anything).
The pages of the APPROACH are at your disposal—so be our guest!
Anymouse

TE

!